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ABSTRACT

This report deals primarily with the design of an integrated free play environment for both able-bodied and disabled children. First, the different types of handicaps (and their debilitating effects) which affect children, and the different mobility aids which are used by these children are discussed. Then, a number of guidelines concerning selection of the playground site, space allocation, and play opportunities are presented along with preliminary ideas for play space design. Also included is a case study which illustrates possible modifications to existing play facilities so that disabled and able children can play together. A one page list of common poisonous plants is appended, and a bibliography is attached. (MP)

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RESEARCH AND DEVELOPMENT PROGRAM

International Year
of the Child 1979



L'Année internationale
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CMHC's participation in the International Year of the Child.

PLAY SPACES
TO
ACCOMMODATE
DISABLED CHILDREN

Research project 14

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1979 - International Year of
the Child

PLAY SPACES TO ACCOMMODATE DISABLED CHILDREN

by JAMES H. MELVIN

This project was supported by the Canada Mortgage and Housing Corporation as part of the research program undertaken by the Children's Environments Advisory Service for the International Year of the Child.

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FOREWORD

The Children's Environments Advisory Service's Research and Development Program for the International Year of the Child has as its objective the advancement of good environmental planning and appropriate family housing design that supports the needs of children and youth (0-18).

An in-house CMHC IYC Committee, consisting of representatives of various CMHC divisions that impact on family housing and regional representatives, identified the gaps in the field. The committee selected projects of directed research to close these gaps and identify problem areas, to find solutions where possible, and to provide input to corporate policy and programs in the field of family housing. Five categories of investigation were selected to respond to these needs:

- Assembly/Production of Data

To assemble a data bank on the condition of children in relation to their residential environment and to relate this data to data being collected by other departments and agencies.

- Evaluation

To examine existing housing situation catering to the needs of families with children at home.

- Design and Awareness Material

To develop proposals for improving housing and the surrounding environment through design.

- Demonstration

To construct demonstration facilities for children, or to introduce improved facilities for children in on-going projects.

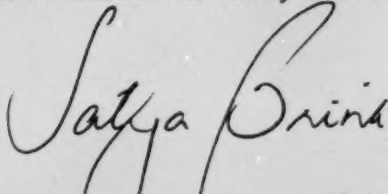
- Development of Policy Proposals

To review the condition of children in Canada, and present proposals to meet or correct emerging problems in relation to housing.

The CMHC IYC Committee will develop for CMHC Management a policy paper based on the facts, figures and findings of the Research and Development Program for IYC, with implications for future policy, programs and research affecting family housing.

The Children's Environments Advisory Service plans to use the focus on children made possible by the Year of the Child to plan new directions for our service. We intend to conduct further research, provide additional resources and sustain the momentum of our advocacy role within CMHC.

This project is one of 21 projects (titles on last page) in the Research and Development Program for the International Year of the Child. These reports are distributed by the Children's Environments Advisory Service.



Satya Brink, Assistant Adviser, CEAS
Project Manager
Children's Environments Advisory Service
Canada Mortgage and Housing Corporation
Ottawa, Ontario
K1A 0P7

THIS REPORT IS BASED ON AN EXPLORATORY STUDY SUPPORTED BY THE CHILDREN'S ENVIRONMENTS ADVISORY SERVICE. THE ILLUSTRATIONS, SKETCHES AND DIAGRAMS INCLUDED IN THIS MATERIAL HAVE BEEN PREPARED BY WAY OF GENERAL ILLUSTRATION ONLY. THEY ARE NOT INTENDED TO BE PLANS FOR THE CONSTRUCTION OR CREATION OF ANY OF THE SYSTEMS OR DEVICES SUGGESTED. THE CANADA MORTGAGE AND HOUSING CORPORATION ASSUMES NO RESPONSIBILITY FOR ANY USE OF ILLUSTRATIONS IN THIS REPORT AS BUILDING PLANS.

PREFACE

"The child shall enjoy special protection and shall be given opportunities and facilities by law and other means to enable him to develop physically, mentally, morally, spiritually and socially in a healthy or normal manner....

The child who is physically, mentally or socially handicapped shall be given special treatment, education and care required by his particular condition.

....The child shall have full opportunity for play and recreation which should be directed to the same purposes as education; society and the public authorities should endeavour to promote the enjoyment of this right."

Bill C-204, An Act Respecting
Canadian Bill of Rights for
Children

ABSTRACT

Play Spaces to Accommodate Disabled Children

James H. Melvin

Most play environments for disabled children are therapeutic and institutional. This report explores the alternatives possible on an integrated play space - a relatively new concept. With integration of the disabled within the community, both able and disabled children should have access to a stimulating play space. The design must accommodate the disabled child and still be challenging to the able child. A number of design guidelines concerning the selection, space allocation and play opportunities are presented along with preliminary ideas for play space design. Modifications to existing play facilities to allow disabled and able children to play together, are also discussed.

Acknowledgements

This research was originally undertaken as a practicum study in the Department of Landscape Architecture at the University of Manitoba. Many persons assisted in its formulation. Many thanks are extended to Professor I. McIntire for her support and comments. Sincere thanks to Mrs. L. Tata, physical therapist, whose professional expertise provided many insightful comments and suggestions regarding the disabled child and his abilities. I am also in debt to the practicum chairperson Professor C. Thomsen, for his relevant criticism and sound advice throughout the compilation and presentation of the material. Appreciation is also extended to Ms. S. Langlands, Dr. Satya Brink and Mr. Abe Yuen .

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1. Introduction

1.1 THE PROBLEM

Play spaces can be designed to accommodate and enhance the physical, mental and emotional growth of a child. They can be developed as places where children can test, hypothesize, create, succeed, fail and investigate on their own; as places that compliment the street, the home, the institution. Rich and varied play opportunities should be available to all children and denied to none, perhaps least of all to the handicapped child.

Handicapped children are children first and foremost. Dattner (1969) is quick to indicate that the play of handicapped children follows the same pattern as that of normal children. "It serves the same function of expanding their experience and understanding of the world, and it affords them the same potential for enjoyment and expression." This is not to say that the handicapped child does not encounter difficulty in traditional playgrounds, but rather his use and adaptation to the equipment is hindered by the degree of handicap that he possesses.

Austin and Hayes (1974) suggest that handicapped children often have a great amount of enforced free time but are denied the right to participate in play through isolation, thus compounding their handicap and leading to social retardation. In short, they point out the pervasive need for play environments that will accommodate handicapped children.

Play, and the environment it occurs in, are important variables in the physical, social and mental growth of a person. When 80% of a child's learning occurs before he is eight and when play is research or learning for life, then the play environment for all children, handicapped and non-handicapped, is of vital importance.

Behavioural scientists and designers have collaborated to develop play environments which attenuate the sterile qualities of traditional playgrounds while emphasizing the manipulative, learning, graduated challenge aspects of the playscape. Playgrounds such as environmental playgrounds, creative playgrounds, and adventure playgrounds have successfully demonstrated their appropriateness as ideal outlets in which a child can educate, experience and manifest those social, physical and cognitive qualities which are influential in the process of growing up.

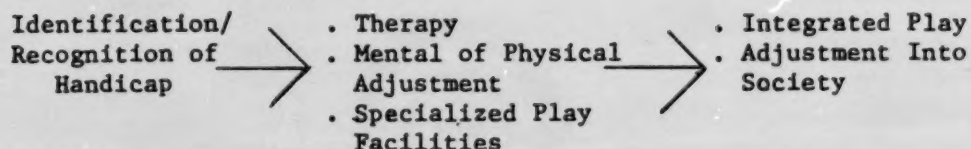
This approach toward the design of play environments has been developing over the last forty years, primarily in European centres. Canada, unfortunately, has not advanced as far in playground design as such countries as Britain, Scandinavia or the United States. Recently however, concerned parents and educators have become involved in the design and construction of play environments which better respond to the needs of their children. Unhappily, even these playgrounds do not accommodate the handicapped child.

1.2 INTENT OF THE STUDY

Two kinds of playgrounds have been idealized for handicapped children: 1) playgrounds specifically designed and staffed for handicapped children where they can attempt and achieve all kinds of physical and mental activities at their own speed without competition from other children;

2) play environments offering integrated play, permitting both handicapped and non-handicapped children to play together and to benefit from the experience; where the handicapped child can learn from observation and imitation of the non-handicapped child, and when necessary, be assisted in the use of some playground equipment. In the latter, the fit child will benefit from exposure to handicapped children and soon realize that they are more similar than dissimilar to himself. Both groups will avail socially from interaction induced in the integrated playground.

While both play environments are valid, the one advocating integrated play is healthier socially and mentally while being more economically sound to build. This is not to say that a specialized playground is unneeded, but rather that it functions as a therapeutic, intermediate step to integrated play. However, at present most playgrounds being developed for use by disabled children are of the specialized type.



While therapeutic playgrounds encourage activities that promote a particular movement or behaviour, integrated play spaces offer self-directed play opportunities along with adjustment to society. The disabled child adjusting to the mainstream of society should be offered the opportunity to benefit from community facilities of which playgrounds are but one.

The primary objective is to develop a playground that affords use by special children, and to minimize frustrations caused by inappropriate design while maximizing opportunities for engagement with a stimulating environment. (Austin, 1978)

The study examines the different types of handicaps affecting children and their debilitating effects. The different mobility aids which are used by children are also examined. Discussions with handicapped children, therapists and teachers, observations of disabled children and information gleaned from the literature, is used to determine guidelines that will assist in site selection, site planning and specific details of certain aspects of the play environment.

The culmination of the study is the design of a play environment to accommodate the integrated play of able-bodied and disabled children. This design will incorporate some of the guidelines established into a site plan/model.

1.3 DEFINING PLAY

Before planning for play one must first define what play is. One must also establish the motives for and the content of play.

Ellis's (1973) examination of why people play exposes how play can be defined by both its motive and content, and concludes that new definition of play will continue to be generated to fit the current concepts of play behaviour.

Caplan (1973) states that play is a child's way of life. Play offers a child freedom of action; provides an imaginary world, adventure, physical and social development. It also furthers cognitive awareness and concentration, investigation, role playing, is dynamic and vitalizing. Play is in fact, the act of growing up.

In today's society the environment of play is supplanted by the school. Entering school the child finds play scheduled and specified. The child it seems is subject to the demands of two seemingly divergent forces. One, the vigorous routine development of the self through society's involvement via the school, and two, the child's own eagerness to acquire knowledge through self-understanding or play. Thus, while one method of gaining knowledge is unrestricted in its motives, the time available for self-development via this method is restricted by the demands of a formal education.

Thus, the environments closely associated with a child's free time, the school yard, the paths to and from school, and the immediate vicinity of home and neighbourhood, are vitally important in the self-development of the child.

This study acknowledges play as the virtue of all aspects of self-development through interaction with the environment. Specifically, the design is developed for a particular site in mind, surrounding an integrated school where interaction is limited, intense and primarily scheduled. However, the process and design implications identified, are much wider in scope and can be applied to the development of integrated play environments elsewhere.

1.4 THE ROLE OF THE PLAY ENVIRONMENT

Psychologists tell us that play is an extremely important aspect in the physical, mental and social growth of a child. Piaget (1962) and Caplan (1973) both indicate that there are stages of development that a child experiences. In each, different aspects of play are stressed, exponentially increasing the complexity of the individual's behaviour.

Piaget and Inhelder (1969), and Caplan (1973) point out that a child's play pattern stresses different aspects of play as he develops both chronologically and mentally. In early years exercise play is stressed, where a child discovers an action, first doing it to understand it, then doing it for the pleasure of causing an effect and confirming the newly acquired skill. As a child grows, so does the complexity of his play, as he will flirt with danger, be creative and constructive, and invent games with rules.

Thus, in play the child progresses from ritualization of an action to new levels of comprehension which form the basis for new theories, concepts, symbolic representation, associations, and limits. Through play the child learns to understand the world on his own terms.

The play environment must accommodate the progressively demanding play needs of the child. Too often in the past however, playgrounds have only offered sterile asphalt waste lands providing the child with no choice or chance of manipulation and involvement. Playgrounds must accommodate the developmental stages a child experiences in growing up. It must provide degrees of challenge and the flexibility to grow with the demands of the user.

Designers such as Friedberg and Dattner argue that the playgrounds should allow for three basic kinds of play—physical play, social play and cognitive play. These provisions can be met if "the environment provides the individual with an adequate range of experience; and the environment allows for some measure of control by the individual." (Dattner, 1969, p.41) The challenge for the designer is not just to provide the child with something to play with, but to make a palpable, manipulative environment with which the child can react, relate, discover and invent. Ideally the playground should be a miniature model of the world.

Dattner (1969), Moore (1973, 1974) and Friedberg (1970, 1975) stress essentially the same environmental qualities for the playscape in order to achieve a positive play environment. All three advocate that the playground should:

- 1) have complexity offering alternatives and the tools of the growth process,
- 2) provide sequences of movement—through linking of play facilities or the juxtaposition of play facilities,
- 3) allow manipulation—control of the environment by the individual "the degree of inventiveness and creativity and the possibility of discovery are directly proportional to the number and kinds of variables in it." (Nicholson, 1971),
- 4) offer stimulus for cognitive play—to learn by problem solving or observational learning—through openness and adaptability

- 5) offer stimulus for social play and interaction—again through open-endedness and adaptability of equipment, scale of spaces,
- 6) offer a graduate challenge—allow the individual the exhilaration of accomplishment,
- 7) be diverse in movement, manipulation, openness, scale, natural elements, and all sensory dimensions—a basic concept of ecology that diverse environments are resilient and productive.

In the past, concern was focused on providing a space for play, nothing more, nothing less. Little thought was given to the character of the play environment. Today, the role of the playground has changed. In today's society, where less and less space is designated as "safe" areas for children to play in and many "natural" areas for play (river bottom lands, vacant lots, forests) are being usurped for housing and industry, the designed playground is becoming one of the last vestiges for the child to actively and creatively entertain himself. The disabled individual is limited by both his disability and the handicapping environment and he, therefore, especially needs facilities that are designed for his use. Thus, for the disabled person the problem is compounded, by the few well designed play facilities for all children and the lack of those facilities accommodating the needs of the disabled. The neighbourhood play spaces are among those that should be readily accessible to the disabled individual. Here, near the home the disabled child can find a circle of friends whom he can deal with daily and develop with socially in the course of his everyday activities.

1.5 THE CASE OF THE HANDICAPPED CHILD AND PLAY ENVIRONMENTS

Internationally and nationally the child is procuring individual rights. In Canada, Bill C-204, Rights for Children extends concern towards the environment a child should be guaranteed. Although not yet law, the Canadian Bill also recognizes the special plight of the handicapped and stipulates that all children be given the opportunity to recreate.

One small aspect of a child's opportunity for and right to recreation may be interpreted as the playground facilities available to him within walking distance of his home or at the neighbourhood scale. However, even where play environments have been upgraded to challenge the child's ability, the predicament of the handicapped has frequently been ignored.

Only because of the acute awareness of a few individuals have any designs or facilities appeared that attempt to accommodate the handicapped. Richard Dattner was one of the first designers to recognize that the handicapped child's play patterns are similar to that of normal children. He also states that certain design considerations must be made in order to accommodate the handicapped. Dattner cites his example of a hospital playground in New York City to indicate how the handicapped might be accommodated (Dattner, 1969, p.109-117).

More structured playground facilities designed for handicapped children are being built. However, they are mainly found adjacent to special facilities for the disabled. A few of these include: Marlborough Park Special School in Bexley, England; the Magruder Environmental Therapy Complex, Forest Park School, Orlando, Florida; and the Michael Dowling School in Minneapolis.

Probably, the most positive and recent development in the field of playground design for handicapped children occurred in New York City, where a competition was sponsored inviting solutions for a city playground which would accommodate both able and disabled children (Progressive Architecture 4:78 and AIA Journal, March, 1978).

Britain's Handicapped Adventure Playground Association (HAPA) has developed four unstructured adventure playgrounds for disabled children since 1970. HAPA felt that disabled children should be able to play informally in a more exciting, challenging environment than the ones provided in hospitals and special schools. Still, the HAPA facilities are primarily for disabled children.

While rights are being sought for both children and handicapped, many new playground designs, unless specific and specialized in nature, are excluding the handicapped, even though they are integrated into a community.

2. Designing for the Disabled

2.1 PLAY AND THERAPY

"Play provides expression and challenge for the developing organism." (Hunt, p.18) However, if the handicapped are limited in their play experiences additional physical and psychological handicaps may result, constricting their normal responses and further isolating them socially.

Dattner (1969) and Austin (1974) both stress three goals of rehabilitation for the physically handicapped: stabilization or arrest to deterioration of existing abilities; developing and strengthening skills that are imperfectly developed or that have suffered some deterioration or atrophy; and to provide alternate compensatory skills to replace those that are lacking or irreplacably damaged.

While therapy is not play, play can be therapeutic in an indirect way. For the disabled child the greatest therapy is the enjoyment gained from participation.

2.2 CATEGORIZATION OF HANDICAPS

While participation is the key in recreation for the handicapped, the amount of participation is directly related to the type of handicap and its severity.

In general, handicaps can be categorized three ways; emotional disturbance, physical handicap and mental retardation (Austin, 1974).

a) Emotionally Disturbed Children

"Emotionally disturbed" is a non-specific descriptive term sometimes used to describe a group of disorders which are more serious than psychoses, neuroses and personality disorders.

The emotionally disturbed child however, has full functional use of his body while having some difficulty in the areas of judgment and perception.

b) The Physically Handicapped Child

Among the "physically handicapped" there can exist a remarkable range of physical abilities, emotional and social attributes and intellectual capabilities. Quite often physical handicaps are thought to be only those orthopedic impairments which interfere with the normal use of the musculoskeletal system. Also included in the physically handicapped category are blindness or partial sightedness, cerebral palsy, deafness or hearing loss, and epilepsy.

i) Blindness and Partial Vision

Blind children have varying degrees of vision from total blindness to vision permitting travel without assistance.

Of prime importance, when dealing with blind or partially sighted children in organized or structured game activities, are audible cues to orient the child to a specific end. However, to enjoy a free play environment, the blind child rarely needs any assistance, other than the chance to feel his own way.

ii) Deafness and Hearing Loss

In a play environment deafness is not a severe restriction to the physical ability of the child. In fact, the HAPA indicate that deaf children have a great love of social group activities in which their expression is in a visual imaginative sense.

The deaf have good motor skills, although a poor sense of balance or bouts of dizziness may be evident.

iii) Orthopedic Disability

Orthopedic disabilities are those which prevent individuals from properly performing the motor and locomotor functions of their bodies and limbs. The orthopedically incapacitated can be classified in the following way:

- 1) congenital, e.g. congenital hip dislocation, spina bifida, talipes (clubfoot), scoliosis (a lateral curvature of the spine),
- 2) traumatic, e.g. amputations resulting from accidents, illness and surgery, paralysis resulting from nerve injury, fractures and dislocations, paraplegic—lost use of both legs; quadraplegic—lost use of all four limbs,
- 3) infectious, e.g. osteomyelitis, poliomyelitis, tuberculosis of the bone,
- 4) osteochondritic and nutritional, e.g. Pettheses disease and rickets.

Hunt, p.104; Kraus, p.117

However, Hunt (p.104) states that "the orthopedically disabled child is less affected by his physical incapacities than by how he adjusts to the reactions of others towards him."

The social age of a disabled child depends primarily on the period of life in which the disability occurred. The earlier it happened the more hardpressed the child is to develop the social and motor skills of his chronological age group. (Hunt, p.106)

The disability itself inhibits the performance of normal movements. More specifically, motor performance can be slower, less free and co-ordinated; balance can be poorer, and the functioning strength of other limbs may be decreased. (Hunt, p.106)

Play and recreation are vitally important for the physically disabled child and can concurrently encourage him to lose his fear of moving and help him understand his limits and abilities more realistically.

iv) Cerebral Palsied

Cerebral palsy is a complex disability resulting from brain damage. The condition is regarded not as an orthopedic disability but a neurological impairment. (Kraus, p.120)

Cerebral palsy is classified as mild, moderate or severe in its impact. The degree of destruction in all types of cerebral palsy determines the seriousness of the movement problem.

Not all parts of the body are equally affected as designated in the classifications of cerebral palsy: hemiplegia, quadriplegia, monoplegia, paraplegia and diplegic. While some areas of the body function normally, others are greatly restricted and the condition of movement can be spastic (movement is difficult), arthetoid (involuntary movement), or ataxic (jerky movements).

Kraus (p.120) tells us that cerebral palsy sufferers have difficulty in functioning socially and being accepted by others. Most cerebral palsied have a cosmetically different appearance, have jerky body movements and speech problems which make normal social relationships difficult. As a result, withdrawal and fear of social contact are common among persons afflicted with this impairment.

Kraus (p.120) also stipulates that "the primary function of recreation for the disabled child with cerebral palsy is to promote normal growth and development by providing the kinds of experiences and activities that other children receive."

Hunt (p.139-140) tells us that cerebral palsied individuals can participate more successfully: if activities using stationary or rhythmic objects are used; if activities take place in loosely defined spaces; if activities require free rather than co-ordinated movements; if the action is moderately slow and; if repetitive movements are performed.

v) Muscular Dystrophy

Muscular Dystrophy is a chronic non-contagious progressive disease manifested by the wasting of the voluntary muscular system of the body. Muscle deterioration progresses until the affected individual is completely physically dependent.

Depending on the progress and stage of the disease the child may be ambulatory or confined to a wheelchair. The ambulatory may have difficulty in walking, climbing stairs and getting up from a fall or sitting position. (Austin, 1974, p.2)

There are other physical handicaps such as asthma, cystic fibrosis, and cardiac conditions which children can be afflicted with. These "lesser visible" physical handicaps do not affect the child's physical dexterity to perform normally in a play environment but the endurance of the child suffering from these handicaps is restricted. However, through play a child will tend to increase his endurance up to his tolerance level. Outside of providing rest areas for these children little can be done by the designer of a play space to increase a child's endurance.

c) The Mentally Retarded Child

The retarded child can be described in terms of his sub-average intellectual development which occurred during his development period and is accompanied by his inability to adapt appropriately to his environment. A retarded child has a mental age lower than that of his real or chronological age. The retarded child is not necessarily motorially retarded but often the lower the level of his intellectual functioning, the higher the probability of limited physical or neurological disability. (Austin, 1974)

When planning play facilities for the retarded, the facility should not be inappropriate for the chronological age of the individual but should provide for graduated challenge in the facility use and success.

"The physically disabled child perhaps encounters the greatest number of problems on traditional playgrounds. Although blind, mentally retarded and emotionally disturbed children can also benefit from various enabling features, it is the physically disabled who must demand the most attention in thinking about playground design for the handicapped." (Austin, 1978)

While Austin argues that it is the physically disabled who must demand the most attention in thinking of playground design, it seems rather the design should accommodate all those handicapped individuals confined or restricted in their movement to technical aids. Confinement to technical aids can be attributed to not only physical incapacitation but also as a result of neurological and mental disorders.

Of the handicaps that can affect a child and the problems associated with each disability, vast differences can occur between the abilities of two persons suffering from technically the same handicap. Each child should be dealt with individually through therapy programs aimed specifically towards personal rehabilitation. Thereafter, the child must be given the opportunity to determine his own limits in an integrated context.

2.3 TECHNICAL MOBILITY AIDS FOR HANDICAPPED CHILDREN

Many of the specific activities advised for certain handicaps can be met in modern creative playground designs without making alterations or concessions in the physical structure or layout, thus emphasizing the rehabilitative role of play. However, what does become a concern to the designer when considering play facilities for the handicapped is the functional mobility of the child as a result of his disability.

The functional mobility of the handicapped child can roughly be categorized into three groups:

- 1) the semi-ambulatory—those children capable of ambulatory movements with the aid of crutches, walkers, or prosthetic devices,
- 2) the non-ambulatory—those children only capable of gross locomotion with the assistance of technical aids (wheelchairs, castor karts, etc.),
- 3) those children whose condition enables semi-ambulatory movement but only for a number of hours per day.

It is these individuals that find the physical environment a real handicap with which to contend.

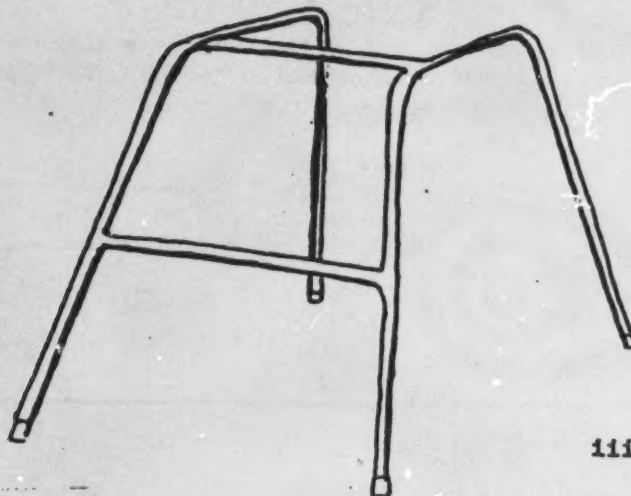
Devices have been produced which allow a disabled child to become more mobile, offer support to achieve a seated or standing position or are therapeutic in nature while offering mobility and/or support. These devices include:

- a) Crutches; axillary, elbow, tripod and quadruped walking aids.



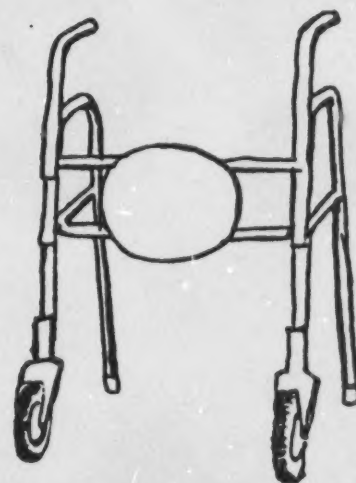
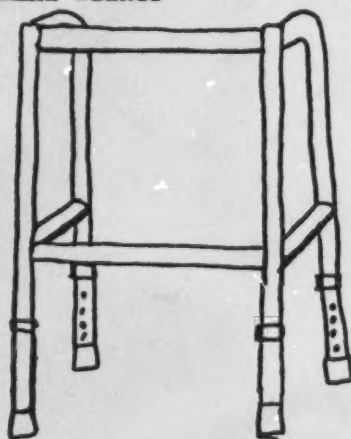
- b) Walkers; parallel walker, adjustable mini-walker, the a-walker, allowing those lacking balance or strength to walk by transferring weight through hands.

- 1) parallel-walker--gives support but is heavier and slower to use.



iii) the a-walker

- ii) the adjustable mini-walker



- c) Orthopedic Appliances; including calipers, braces and splints.
d) Mobility Aids; (1) the Castor Cart—a lower to the ground wheeled cart, propelled by pushing the wheels with your hands. Being low to the ground permits a quick and easy transfer in or out of seat.

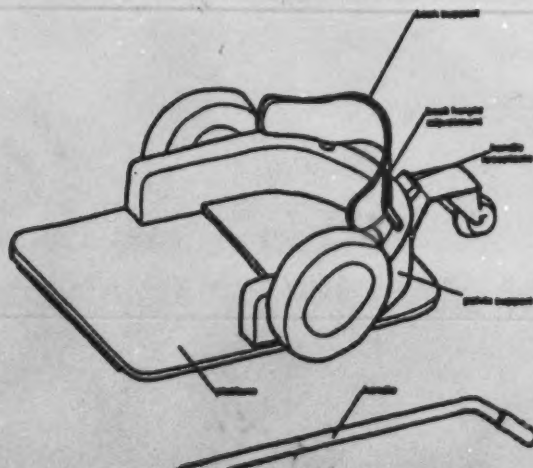


Diagram from Holte

(ii) the Pommel Walker—a scissor-type frame apparatus permitting the user to stand upright while giving him mobility. Use on rough surface areas can be inhibited because of small castor wheels.

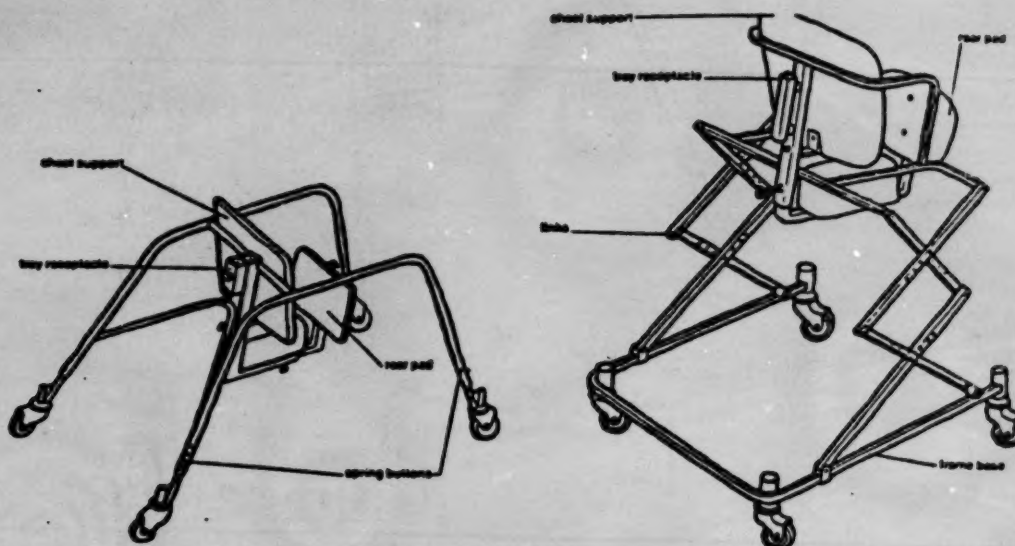


Diagram from Holte

e) Standing Devices;

(i) The Standing Brace Mark II—permits crutchless standing for work and play, while maintaining user in a rigid upright position. When used in association with a walker can help children learn to walk.

(ii) The Parapodium Mark II—a standing and mobility device, permitting crutchless standing and walking with the aid of crutches or a walker and by using a swing through gait. Locking knee and hip joints permit sitting without removal of the device.

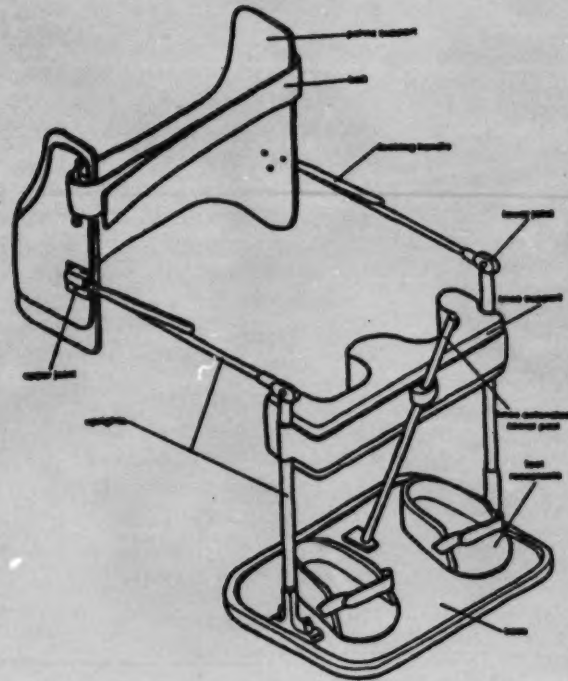
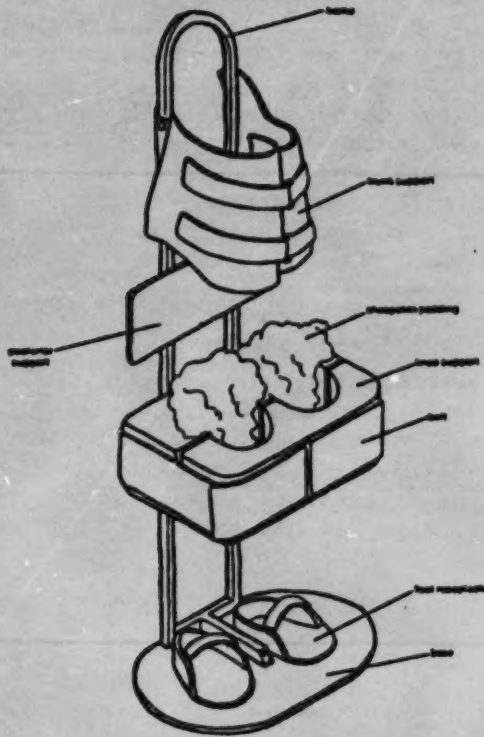


Diagram from Holte

- f) The Wedge and Prone Board; although not mobility devices they are useful for play activities in the prone position and encourage head control, hip extension and forearm or extended arm propping.

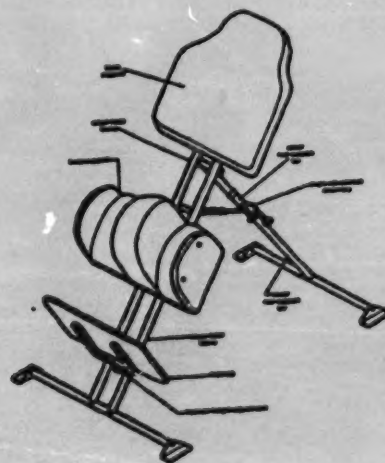
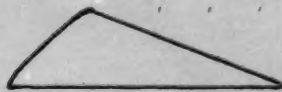


Diagram from Holte

g) The Wheelchair;

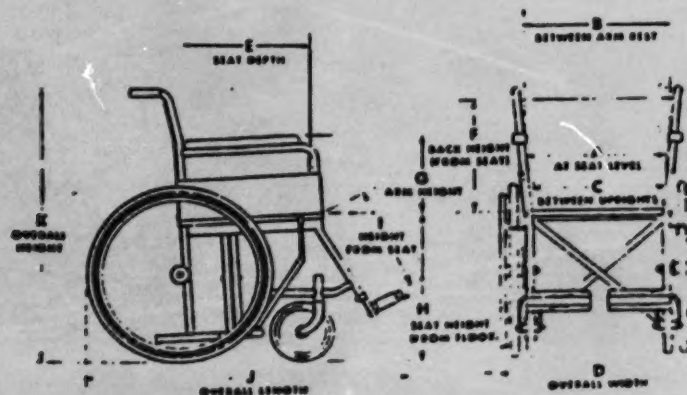
In the United States there are five sizes of wheelchairs: small child, large child, junior, adult and oversize. The small chair is for children from two to six years. The large child chair is the next standard size of wheelchairs and is for children between six and twelve years of age. Allowance for growth is made by adjustment of the legrests and the width of the back and seat. As the width is changed, the greater opening of the chair lowers the seat which was high to begin with, because the chair was not fully unfolded. This increases the relative height of the armrest. (Kamenetz, p.128-130)

As the patient increases in weight and size he progresses through the junior, adult and, if need be, oversize models.

The dimension which is of most importance to the designer when planning any facility to be used while in the wheelchair (i.e. elevated play tables) is the height of the seat from the ground and the height of the armrest and width. These dimensions will help determine the relative height of the facilities. But as noted in the large child's chair these heights have the tendency to vary the greatest.

The principle dimensions of standard wheelchairs are given in the following table:

	Small Child	Large Child	Junior	Adult	Oversize
Seat Height (H)	18	20	19	20	20-22
Seat Width (C)	12	14	16	18	18-22
Seat Depth (E)	11	11	13-15	16	16
Leg Length (I)	3-9	7-11	13-18	15-20	15-20
Arm Height (G)	6	7	9	10	10
Back Height (F)	17	15	16	16	16
Overall Height (K)	35	35	35	36	36-38
Overall Length (J)	30	33	39	40	41-42
Overall Width (D)	19	21	22	24	26-30
Width Folded	10	10	10	10	11-12
Weight in Pounds	35	41	41	43	46-48



Diagrams from Kamenetz

Note that these are standard dimensions for wheelchairs; many accessories, bolsters, padding and other modifications can be made to personalize the chairs, altering these measurements. There are wheelchairs made with seat heights of 16 3/4 inches and 17 inches which increases the discrepancies in possible heights to 5 1/4 inches. With motorized wheelchairs the main difference in the measurements is the added weight and usually smaller rear wheels with no hand grips.

Wheelchairs are used by persons with all kinds of disabilities and are customized to the patient. Electric or motorized wheelchairs are most prevalent with children suffering from muscular dystrophy.

h) Specialized Vehicles;

A number of specialty items have been devised for mobility in play. Many of these include traditional items such as tricycles and go-carts. The primary adaptations include an alternative method of propulsion other than foot pedals. There are tricycles with hand pedals to generate motion to the chain and wheels or pumping handles which steer, stop and propel the vehicles. Even play equipment such as toboggans must have special sides affixed so the handicapped child will not fall out. Children are often encouraged to use these items in order to reduce their dependency on the wheelchair.

Thus, the designer must not only be cognizant of wheelchairs when planning playgrounds, but of all the aids which enable the child to move about and play in the prone, seated or standing position.

3. General Goals and Objectives for Play Environments

3.1 GOALS

A general goal to strive for in all playground designs, especially those concerning special children is: "to minimize frustrations caused by inappropriate design, while maximizing opportunities for engagement with a stimulating environment." (Austin, 1978)

Specific to this project are the goals:

- 1) to provide an informal, exciting and challenging play environment which will accommodate handicapped children,
- 2) to encourage and integrate wherever possible the play of able and disabled children,
- 3) to provide a variety of play experiences for the total development of all children.

To satisfy these goals a number of objectives can be formulated which categorize areas of concern under which design guidelines can be developed.

3.2 GENERAL OBJECTIVES

1) Access

- . The play environment should be conveniently accessible from adjacent interior and exterior areas.
- . Play facilities should be accessible to all children, within walking distance at the neighbourhood scale.
- . The play environment and facilities (seasonally appropriate) should be accessible for year-round activity.
- . Area should be accessible for emergency and maintenance equipment.

2) Function

- . The environment must function so as to respond to the physical, social, cognitive, creative and individualistic aspects of play of all users.
- . The play environment and facilities must be safe.
- . The play environment should be self-motivating; it should not depend on paid supervision to function properly.

3) Organization

- . The environment should be organized so that it provides non-conflicting areas for the physical, social, cognitive, creative, and individualistic aspects of play.
- . Self-choice rather than compulsion should be stressed in the use of facilities.

4) Quality

- . The play environment should be varied and diverse offering a combination of soft and hard areas and natural and man-made elements for the user to explore and discover and manipulate.

These are objectives which should be stressed in the design of all play environments. However, they become vitally important when dealing with disabled individuals who have movement or sensory problems.

4. Designing to Accommodate the Disabled Child

4.1 SOME LIMITATIONS OF DISABLED CHILDREN

In order to gain a better understanding of the limitations and capabilities attributed to the disabled child, several children were observed at school, therapy and play on numerous occasions.

The child's ability to dismount and mount his wheelchair is of primary importance. The dismount procedure can be accomplished by sliding from the seat to the wheelchair footrest, then onto the floor, or by a direct transfer to the floor. Dismount also occurs from the chair directly to apparatus such as a raised platform or steps. Mounting the chair can be much more difficult as it depends on very strong upper body muscles especially in the arms. Some children are able to crawl up and into the chair but many need the assistance of steps for dismounting or mounting of the chair. In the play environment the wheelchair should be forsaken for more unconventional modes of transport.

In a wheelchair most disabled children can play constructively at table-top height, actively receive and retain objects in a sport or race their wheelchairs around obstacles.

Children suffering from spina bifida feel most secure in their wheelchairs. The spina bifida child lacks feeling in the lower limbs, and their lack of body awareness can stimulate a fear of height even when the child's feet are on the ground. These children are also unable to detect sprains, fractures, pressure sores or skin damage in their lower limbs.

Being out of the wheelchair is not dangerous for the child and relief must be experienced when the bond of the chair is broken in favour of crutches, walkers, parapodium, pommel walker or physically crawling, slithering or rolling. Locomotion activities tend to tire the individual very quickly. Some children can roll, crawl, or seal walk approximately 25-40 feet before needing a rest. This is a limitation to be considered when planning play facilities that would be experienced without the aid of a wheelchair or walker. Again, independence from the wheelchair should be stressed in the play environment. The playground should not be geared toward wheelchair play, but rather permit easy access by wheelchair or mobility to areas where the activity is not entirely from the seat of a wheelchair. There are things to do while out of the wheelchair.

Seemingly natural hiatuses or rest areas should be designed into facilities where disabled children can rest. The provision of shade and drinking water is also important as some of these children perspire profusely or dehydrate quickly through activities.

The pommel walker, while providing relief from the wheelchair, can be more difficult to steer, as the children are using limbs which they do not have great control of to propel the walker. Thus, protective rails or curbs should be constructed along walkways to contain misdirected wheeled vehicles. Right angles should also be avoided to ensure movement in a generally forward direction.

Some disabled children have poor sitting balance and thus need back and arm support when in this position. On equipment or facilities requiring the seated position in order to partake, some seats offering back and side support should be provided, as well as other seat restraints appropriate to the activity.

Their participation in games is more important than winning. With ball throwing or pitching activities some allowance must be made for the child's inability to throw over distances. This lack of ability can be due to spasticity (which reduces reach), muscle weakness, or poor sitting or standing balance which reduces stability of the throwing position. Stability can be gained from a support structure such as a railing or walker, or from the assistance of another person.

Poor grip, muscle weakness or the need to support the body with one hand while throwing with another may require the use of a small light ball or a pliable object such as a "nerf" ball or bean bag for the projectile.

When throwing at a target poor eye-hand co-ordination, and problems with perception of space and distance may pose a problem. Markers indicating the distance from target as well as varying sizes of targets can be helpful. The child can be his own judge of either increasing his throwing distance from the target or throwing at targets of smaller sizes.

Those objects used to strike objects may also have to be adapted for use by disabled children. Hockey sticks and baseball bats may be made of light durable plastic and the objects such as pucks and baseballs will also have to be adjusted in weight and size.

4.2 BASIC APTITUDES TO BE STRESSED IN A FREE PLAY ENVIRONMENT FOR HANDICAPPED CHILDREN

In a therapeutic play environment activities are usually performed in such a manner as to ensure a predicted outcome. In a free play environment the goal is enjoyment from participation. The therapeutic results occur indirectly through the active use of the equipment. In this sense therapy is present through normal play activities and through the realization of new skills.

Evans (1977) and Austin and Hayes (1975), list the skills and abilities to be stressed in the development of young handicapped children. Emphasis will be placed on these skills in regular therapy sessions. In the play environment, while all skills may not be evident, many will be fulfilled through operation, emulation or while commanding the use of equipment. These skills are:

a) Gross Motor Development

Definition: The development and awareness of large muscle activity.

Activities: Those involving the use of the whole body; rolling, crawling, walking, skipping, climbing, receiving, and running. Other components of motor skill development, because of their contribution to the mature pattern of functioning include--body awareness, rhythm, and balance.

b) Physical Fitness

Definition: Improvement of general physical condition both physiologically and psychologically.

Activities: Those that increase the degree of strength, flexibility, balance, endurance, speed, co-ordination, cardio-vascular fitness.

c) Sensory-Motor Integration

Definition: The use of sensory information to refine motor activity (motor skills, movement patterns).

Motor skills or activities limited in extent and involving a single or a limited group of movements. Movement is limited but accuracy is stressed.

A movement pattern is a series of movements organized in a particular time-space sequence. Movement is stressed but accuracy is limited.

Activities: Balance (static and dynamic) and rhythm (locomotion movement) involving gross and fine motor movements, laterality (internal awareness that body had left and right side), directionality (extension of laterality into the external world).

d) Perceptual Motor Skills

Definition: The functional utilization of primary auditory, and visual motor skills, touch and proprioception. Slight imperfections or impairment of any one system can disrupt the whole network and cause extensive imperfection.

Activities: Those developing abilities to receive auditory stimuli, retain and recall information, observe and identify, eye-hand tasks, and the ability to plan an appropriate motor task from information received.

e) Social Interaction Skills

Definition: The skills involved in social involvement and adaption.

Activities: Those encouraging peer group involvement, concession and reception and decision making.

f) Conceptual Skills

Definition: The functional level of concept attainment and general reasoning ability.

Activities: Those encouraging the child to utilize general information through re-organization, simplification, prediction, questioning, synthesizing or systematizing.

g) Emotional Responsiveness

Definition: Expression of feelings appropriate to environment situation.

Activities: Drama, make believe, pantomime, direction, role playing.

Some of these skills and abilities are more appropriate to playground activities than others. Some are realized in all aspects of play, others in only select play activities. Play opportunities that provide for the development of such skills are:

- 1) games with ball or objects off the ground,
- 2) ground related games using the whole body,
- 3) games of strategy requiring smaller spaces,
- 4) activities of risk, challenge, muscular control, dexterity,
- 5) social activities performed with others,
- 6) creative activities of self-expression,
- 7) intellectual activities that include a sense of inquiry.

C.M.H.C., 1979

4.3 THE FREE PLAY ENVIRONMENT

Free play refers to the child's ability to do anything he wants. Schoolyards, playgrounds and parks can all be considered free play environments; that is, areas where the actions of the child are limited only by the diversity of the environment and his own imagination. In places where the diversity of the physical environment is small and facilities encouraging a number of activities are few, the child's imagination cannot be relied on totally to provide amusement. The greater the opportunities the higher the play value.

Free play for the handicapped child means the ability to do things on his own; without constant aid from others and to experience joy through self-participation in the use of the facilities. Too often the handicapped child is dependent on an able individual to assist him in the use of equipment or play with him. Rarely is he allowed to go forth and discover and manipulate the environment at his own pace or in his own way according to his own capabilities.

Play can be classified as either passive or active. Physically passive play usually entails a child playing alone in an inwardly active imaginative, creative manner related to each play experience. Active play entails physical exertion usually related to participation with others. While rules are not necessarily involved in active play, conduct is often ordered and structured through the physical environment or via common understanding amongst participants. Casual surveillance by parents, elders or peers should function only to assist and protect a child not to limit or direct his play experience.

A number of physical, social and cognitive benefits have been attributed to frequent and regular free play experiences. HAPA (1974) and Austin and Hayes (1975) document these as follows: physical benefits include an increase in breathing capacity and lung action, accompanied by a longer duration before exhaustion due to better utilization of energy reserves. There are also increases in agility with a reduction in the number of movements required for a task. Coincidental with the development of strength and ability is an increase in the child's confidence. The child's cognition is advanced through greater concentration and attention and by the chance to observe-question-investigate-test and hypothesize. Socially, the handicapped child derives pleasure just from the opportunity of being with his peers in a similar environment. To play alongside his mates socially must be tremendously rewarding.

To accomplish the task of providing handicapped children the opportunity to play with and alongside able-bodied children is not simply to solve the problem of accessibility, but also entails adapting equipment for continued use by all groups. To design special equipment for use only by handicapped children would only isolate them and further ignore their social needs. Accommodation of all children in the playground, results in mutual benefits for both the able and disabled. The integrated situation is a two-way experience. The handicapped child develops socially and the non-disabled child learns to accept the handicapped person as an individual. Since play is a rehearsal for life the integrated playground could be viewed as a mainstreaming outlet preparing the disabled child for life in an integrated society.

In order to reduce the complications that confront handicapped individuals in a play environment a number of design guidelines can be employed in the development of the play space so as to accommodate the handicapped individuals.

5. Design Guidelines

5.1 PLANNING

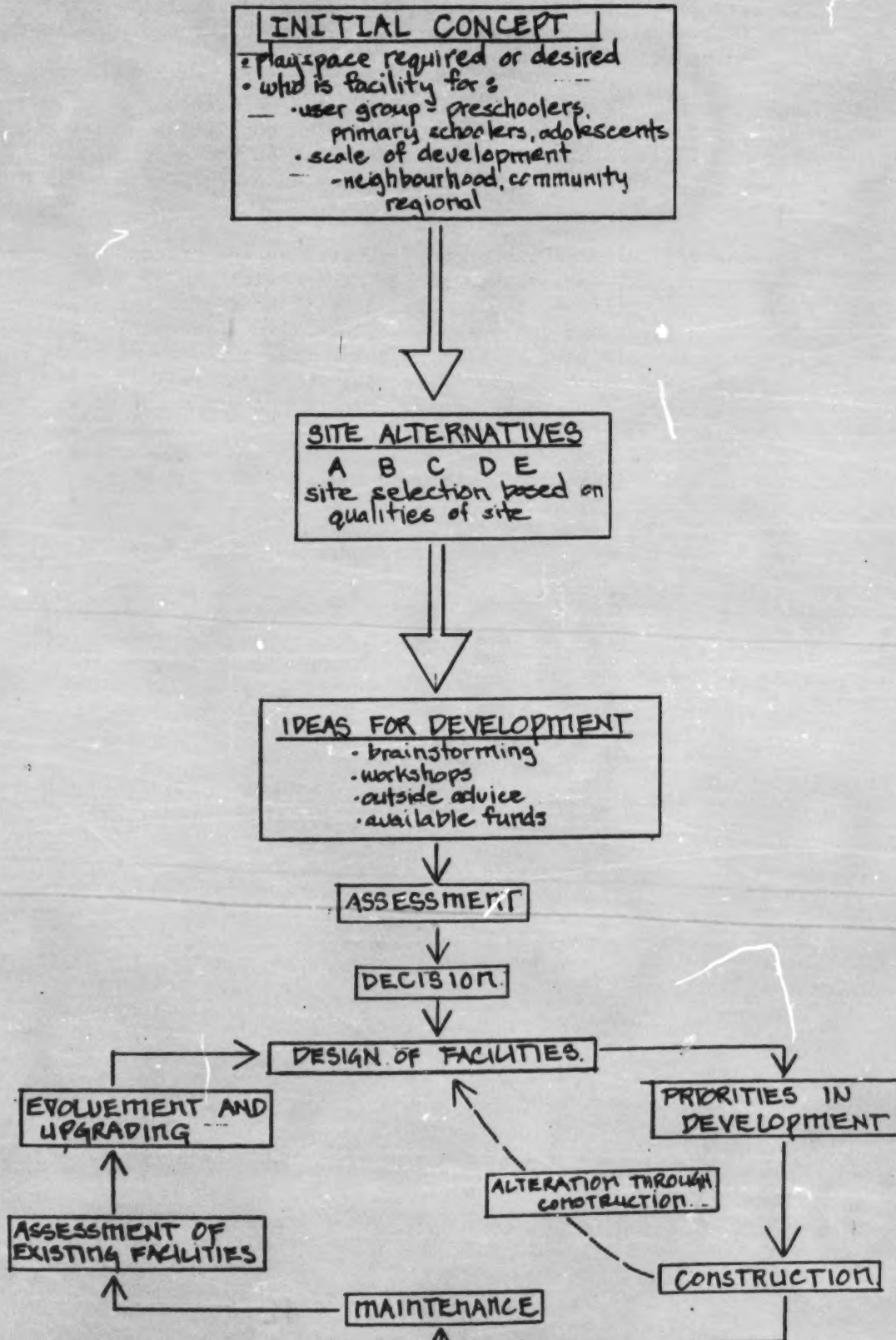
In the development of any play facilities, community involvement of both parents and children is vital. The community should be involved from the initial planning stages of site selection through construction to upgrading and maintenance of the facility.

The planning, designing, construction and maintenance is a cyclic on-going process which does not end with the completion of the play facilities. Rather, there should be an evolution and adaption of the facilities through the years to meet an ever changing demand as the population profile is altered.

Parents and children can become involved in the process in a number of ways. They may be involved in its design with professional designers through consultation, brainstorming, workshops or questionnaires or by realizing their own designs. Involvement in construction may be apparent through volunteer work in a "build your own" scheme or by collecting materials, such as spools, tires, poles and railway ties for its construction. Post-construction supervision and maintenance is another important area of involvement.

Parents and children both, tend to be proud of, and highly use and respect the facility because of involvement in its development. An understanding of the time and effort involved in its continued use is passed on and the feeling of ownership can dominate to protect and prolong its use.

The following flow chart diagrammatically shows the stages involved in the planning process:



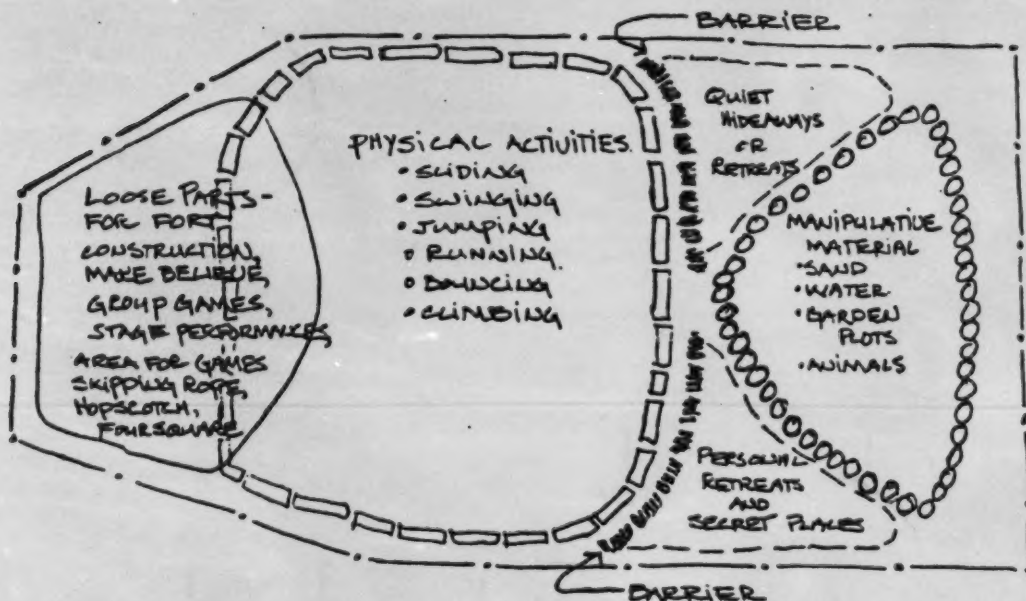
5.2 SITE SELECTION AND LOCATION

The ideal situation would be to have all playgrounds accommodate the disabled child, as a play space for handicapped children is a play space for all children.

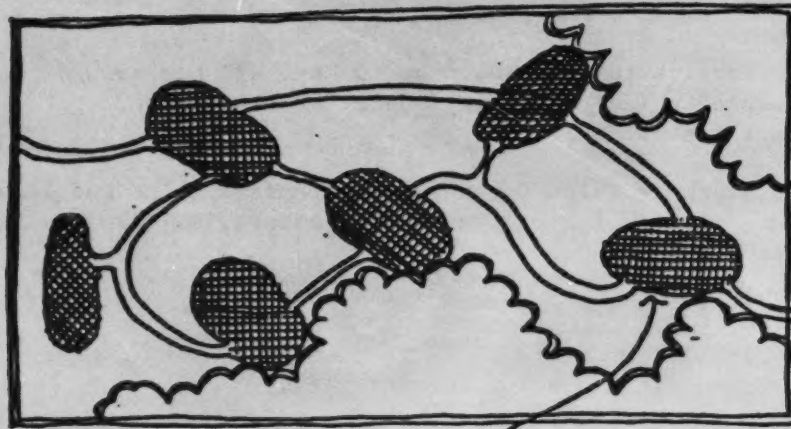
Qualities by which to evaluate potential sites and locations include size, micro-climate, topography, access, existing and complementary facilities.

a) Size

The space should be large enough to allow for physical, social, creative and quiet retreat play.



The dilemma is encountered when dealing with the spatial requirements of the play area. While using a mobility aid the disabled child can cover quite a large area of ground. The walks or paths to accommodate these aids should be wide and ramps for their use are also space consuming. Once out of an aid, however, the disabled child's mobility is severely reduced, dictating the organization of certain areas for activities be comprehensive in scale, so as not to completely deplete the child's energy in his locomotion about the space.

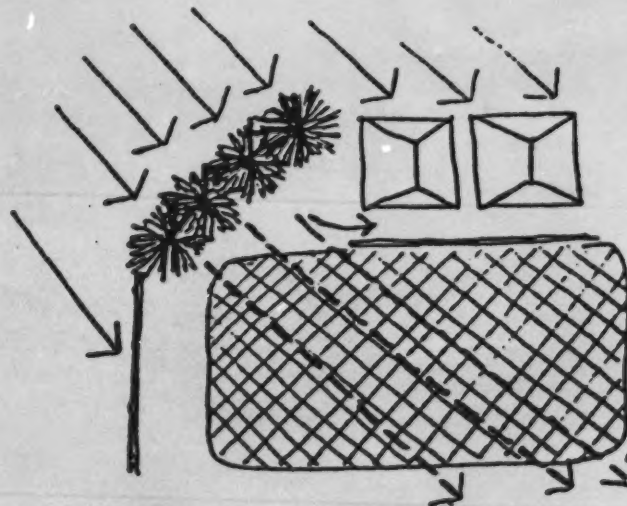


OVERALL SIZE AREA
IS LARGE

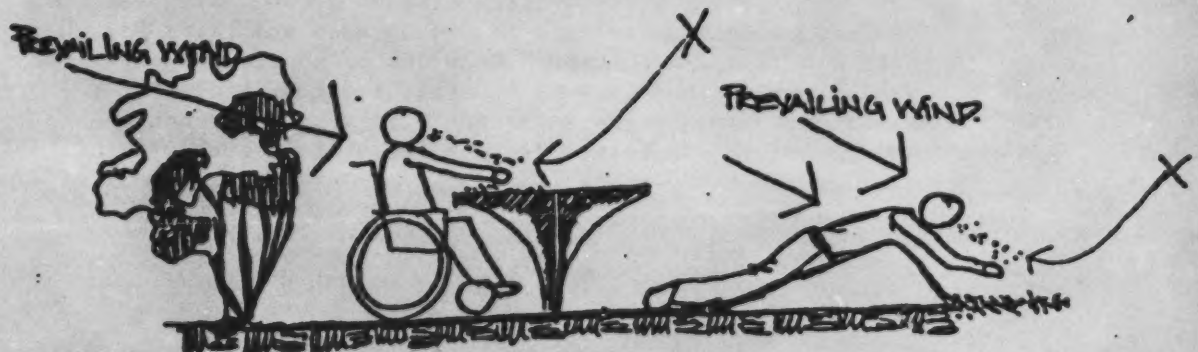
SMALL AREAS OF INTENSE
FREE OF AID ACTIVITY.

b) Micro-Climate

Natural or man-made characteristics should provide protection from prevailing winds.



Some disabled children will be playing on their stomachs or at heights in sand thus the prevailing winds should be buffered to reduce the amount of free-flowing sand.

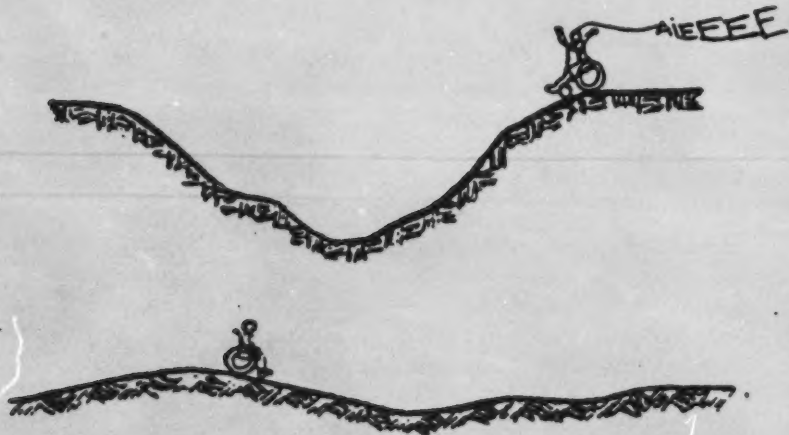


.Shaded areas of play are important as handicapped children can become dehydrated quickly. Due to medication they take, they may perspire profusely.



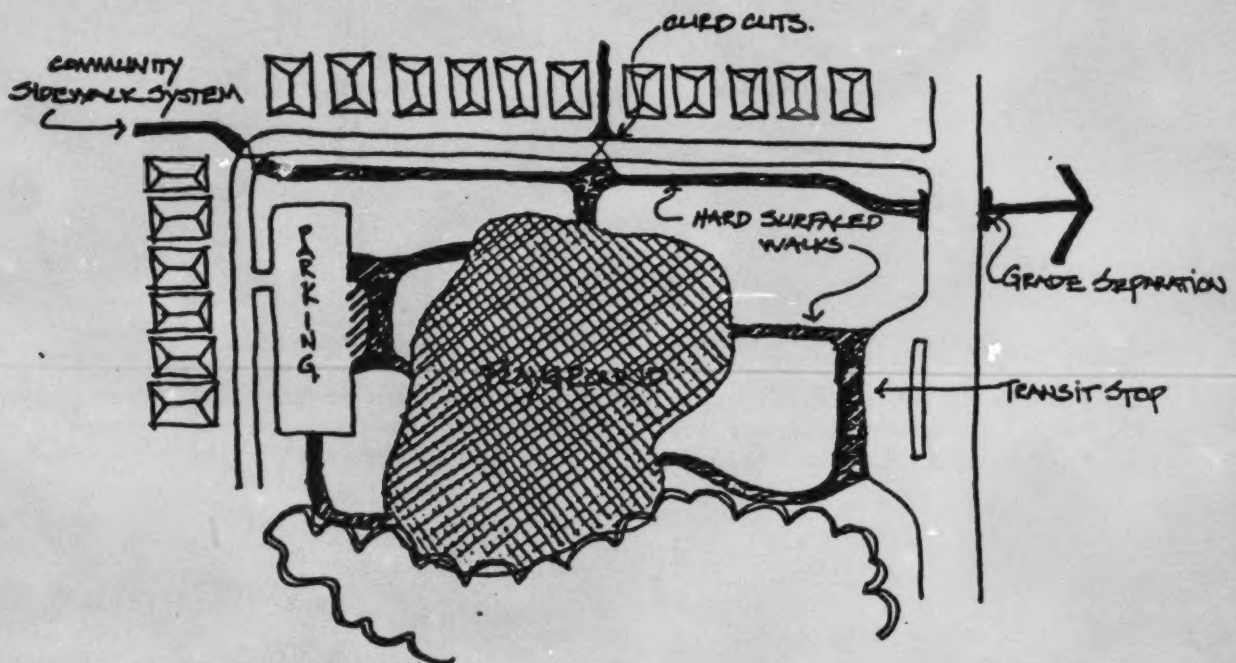
c) Topography

.A flat or mildly undulating topography is desirable. Steep slopes pose physical and costly constraints when designing or planning for disabled children. (for design slope see section 5.3d)



d) Access

- .Neighbourhood play spaces should be within the home range or walking distance of children.
- .The play site should be accessible by a hard surfaced safe route other than a roadway.
- .Circulation surfaces within the playground are to be of a hard non-skid nature (3' - 6' wide).
- .Area should be easily accessible by car, public transit or handi-transit.
- .Depending on scale, the area should be easily accessible at the regional, community or local scale.



e) Existing and Complementary Facilities

- .Facilities near by which can be used by all members of the family make any trip to the playground multi-purpose. Complementary facilities might include athletic fields and court sports, zoos, conservatories, bicycle path, existing playground facilities, natural areas, trails, art galleries, museums, etc.

5.3 SITE PLANNING

a) Function and Organization

The objectives state that the function and organization of the play space should provide areas for the four categories of play in a manner that each will complement the other without interference. Each category of play, physical, social, creative and individualistic, is realized in a different way while stressing the use of different parts of the body. Each category has physical requirements which can be designed to conform to the functioning of the body. While being spatially separated, each category is inter-related forming the total play environment.

1) Physical Play

.In the physical play area the whole body is in motion, usually in a random and noisy manner. Activities which stress gross motor development, sensory-motor integration, and physical fitness are usually planned for this area.

.The apparatus can define the child's activity, as swings and slides do, or the facilities can be opened providing the base or skeleton for the child to be physically creative on, or an open, hard surface space where physical pick-up sports can take place.



.Creative climbing structures are important in modern playgrounds, but to exclude that apparatus which defines play can be dangerous. Many disabled children are unable to play in a totally unstructured environment and need the equipment which defines an activity.

.Due to the size of the equipment deemed appropriate to achieve the excitement and enjoyment of physical play and the active and random nature of it, the area set aside for physical play is usually quite a large proportion of the total site.

11) Social Play

The activities involved in social play quite often entail the use of the whole body as well. The physical structures and the spaces created in the physical play area often become the backdrop for social play. Some play equipment encourages mutual involvement for its proper use. If use of it means the integration of able-bodied children and disabled children then all the better.



Because social and physical play quite often make use of the same equipment these two aspects of play are frequently adjacent to one another.

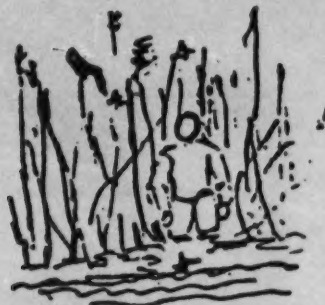
The physical quality of the play environment should provide areas that permit or encourage interaction amongst children on a passive or active scale.

111) Creative Cognitive Play

This play area should contain palpable, manipulative material to stimulate an individual's creativeness. Primary materials include sand and water and when found in combination with "loose parts" (pots, blocks, boards, etc.) the child's creativeness is limitless.



A natural environment with plants and animals is a prime area to increase a child's knowledge of how the world functions. Subtle details in the play environment such as basic shapes and colors can become part of the child's everyday experience and knowledge.



The most difficult aspect of creative cognitive play for the disabled child is access to manipulative materials and convenient spaces for their use.



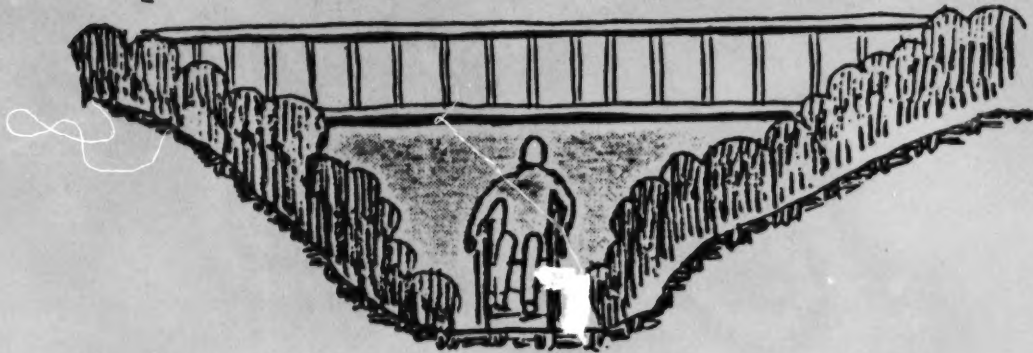
The creative play area should be planned where interference or interruption from the physical play area cannot occur. However, the creative play area should not be so remote that the children playing there do not feel that they are part of the total play environment. Activity paths to, views to and noises from the physical play area can all be part of the creative play environment.

iv) Individualistic or Quiet Retreat Play

Areas should be provided in the play space where the individual child can escape the activities and attention of other children. These spaces cannot always be planned, rather these are spaces a child will discover and personalize on his own.



.For the handicapped child these spaces can be hard to find, for once off the beaten path, the child may have trouble maneuvering a wheelchair. However, if there are some remote areas of the play environment which are accessible the disabled child will soon discover them and stake a claim on them.



b) Surfacing

- . In a play environment all types of surface materials can be used. Each material has characteristics and qualities which are both desirable and undesirable depending on how, why and where they are used.
- . Surface material in a play environment must be soft to cushion falls, hard for court and wheeled sports, resilient to heavy use and durable to climatic influences. However, no one surface material has been developed which has hard, soft and variable surface characteristics.
- . Surfacing material can be classified into soft, variable or hard and the characteristics by which to judge their suitability for uses can be listed.

1) Soft

- . crushed rock
- . earth
- . lawn-grass
- . river rock
- . bark chips
- . sand

Soft Surface Characteristics

- . irregularity and softness can make walking difficult
- . difficult surfacing for people with mobility handicaps or for wheeled vehicles to negotiate
- . susceptible to erosion
- . withstands only light traffic
- . softer materials such as sand and grass are ideal to cushion falls
- . well drained
- . low installation costs, high maintenance requirement
- . manipulative

- | | |
|---|---|
| <p>ii) Variable</p> <ul style="list-style-type: none">. unistone (sand base). turfstone. brick (sand base). patio-stone (sand base). wood--deck --rounds. exposed aggregate | <p>Variable Surface Characteristics</p> <ul style="list-style-type: none">. materials of modular form--installed in pieces. overall surface made of small units which can fluctuate with frost heaving. irregularity in surface and wide joints can make walking for disabled individuals difficult. moderate maintenance requirements, moderate to high installation costs. joints can trap crutch or cane tips, narrow heels and small wheels; joints should be no wider than 1/2". ice and snow removal can be difficult. joints, colors and patterns can be basis for creative games. can be used to help delineate space, change of activity or use of area. wood decking can have smooth finish to facilitate sliding and crawling |
| <p>iii) Hard</p> <ul style="list-style-type: none">. asphalt. concrete. tile/brick in concrete. terrazzo | <p>Hard Surface Characteristics</p> <ul style="list-style-type: none">. firm and regular surfaces for walking or wheeled vehicles. high installation costs, low maintenance cost. ice and snow removal feasible without damages to surfaces. expansion joints should be kept to a minimum. asphalt, black color, retains heat in summer. asphalt, overall rough surface, tough on children who must crawl or slide. concrete cracks from frost action where asphalt tends to be more flexible before cracking. concrete, tile and terrazzo can be trowled or polished to a smooth surface allowing sliding. concrete can be built into forms such as play pads in sand boxes and ramps. oil base of asphalt can stain persons and damage plants. appropriate where water comes in contact with wheeled mobility aids |

At a time when playground designers are advocating a reduction in large areas of hard surface, designs of play spaces for handicapped children must advocate the reintroduction of hard surfaces capable of allowing unimpaired wheeled vehicle movement. A smooth or slick hard surface is also useful in those areas where disabled children must slither or slide to participate.

.Soft surfacing is excellent in areas where children might fall or rough play could result in injury. This material can be natural such as sand or artificial such as air cushions or foam.

.Whatever the material and its use the designer should be aware of problems arising where two materials meet and the design solution should not have any lip or wide joint if wheeled vehicles are to smoothly traverse the junction. If a surfacing junction occurs where wheeled vehicles are not to traverse then definite containment, curbs or edges should be established.

c) Circulation

.In order to ensure disabled children accessibility to all areas of the playground a circulation system of a hard surface material should be provided. The circulation system is an important aspect of the environment for it can determine patterns of use, sequence of movement, and attach prominence or unimportance to different areas and facilities. Unlike the random and uninteresting quality of vast expanses of asphalt, and the tendency towards exclusion from facilities of wheeled vehicles if only soft material is used, a hard surfaced path system can provide definite links to facilities while meandering around the soft surfaced play areas.

.The circulation system should encourage a "natural" flow between facilities. Many times this will be the only link between facilities for the disabled child. The links thus become vital play areas and facilities for the disabled.



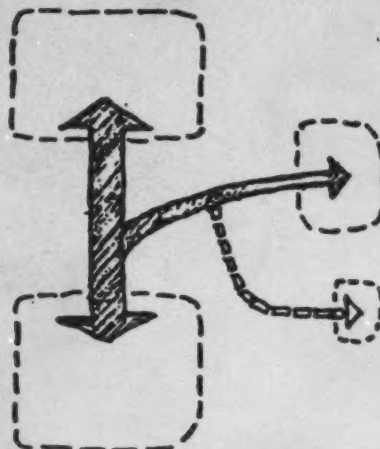
.Right angles are to be avoided in the path system to facilitate an unimpaired forward motion.



.Hiatuses or rest areas should be included in the circulation system.



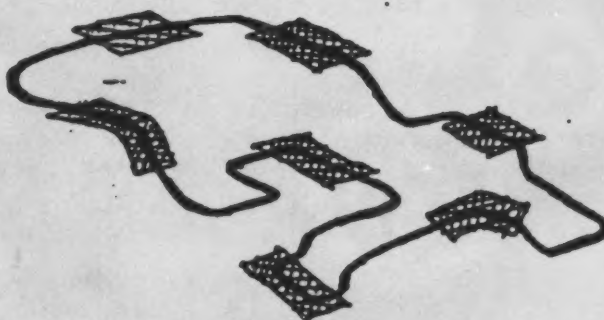
- . A hierarchy of path sizes and material construction could be established to delineate the importance and use of areas.



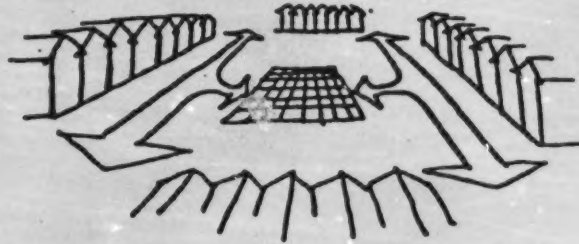
- . The circulation about equipment or playground should be circuitous so as to guide disabled children back to areas where mobility aids might be abandoned.



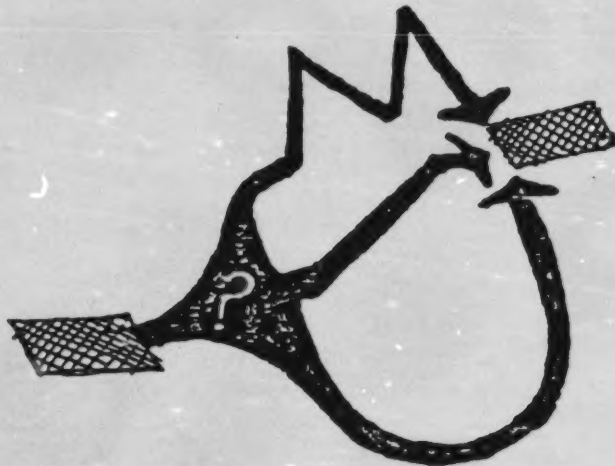
- . A circulation system should become a play environment on its own.



.The circulation of the playground should connect with neighbourhood or community pedestrian circulation while being separated from vehicular traffic.



.The circulation system should provide choice.

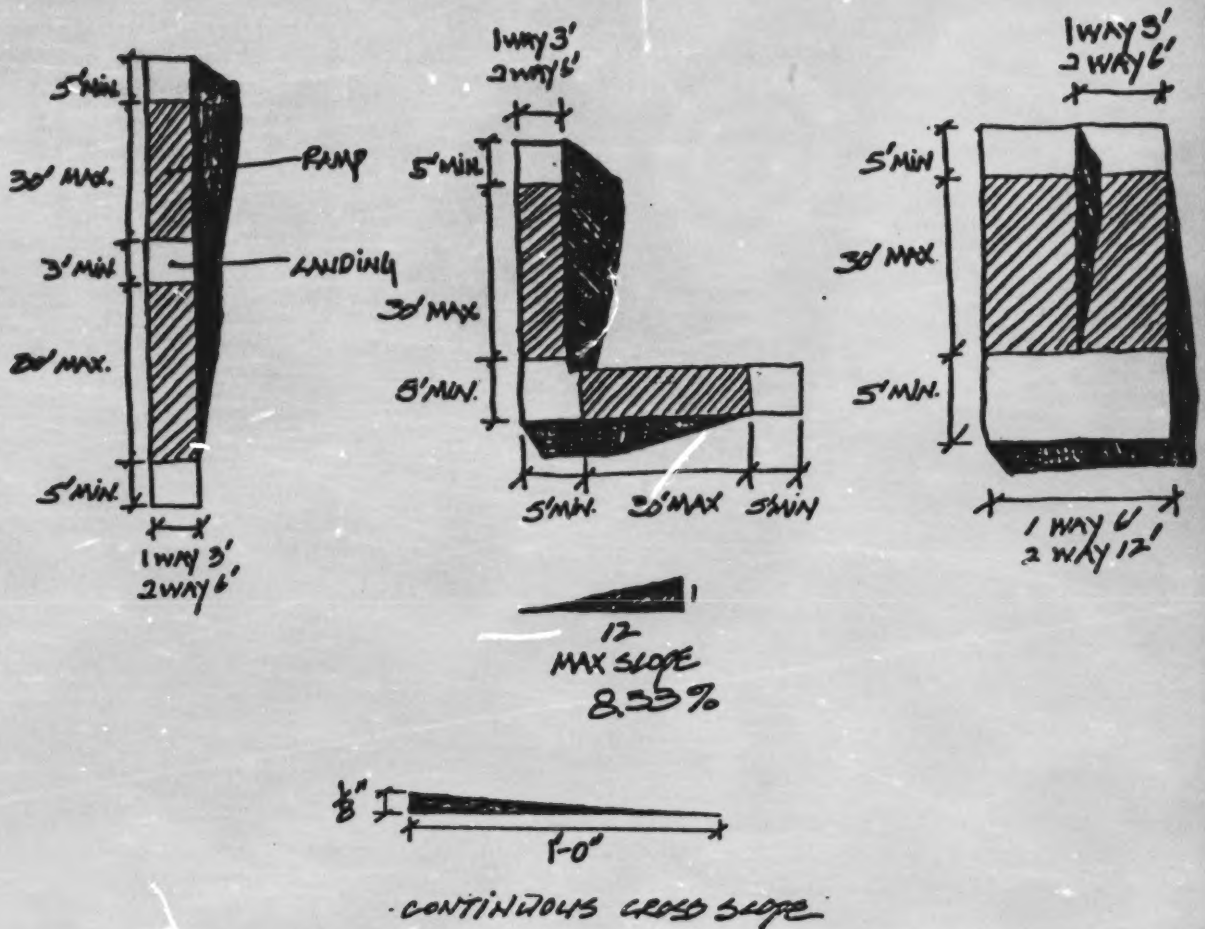


d) Walks, Slopes, Ramps, Handrails

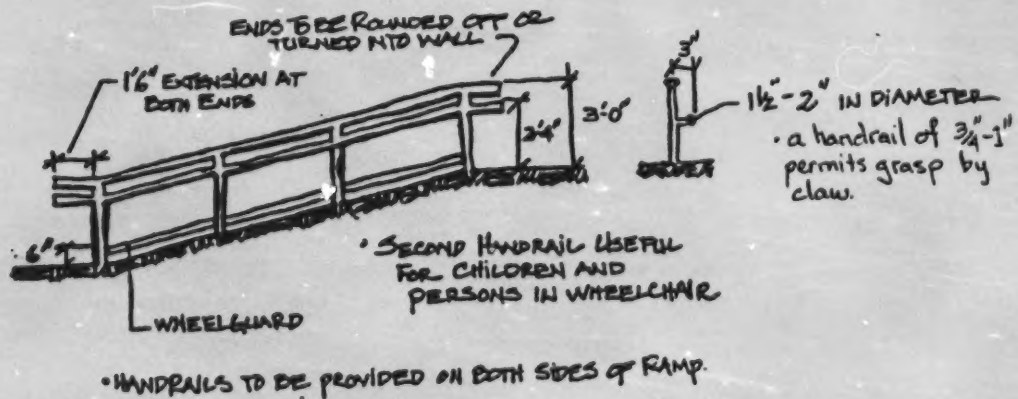
.Walks should be stable and firm, relatively smooth and of a non-slip surface. One-way walks should be no less than 3'0" wide and two-way walks no less than 6'0" wide.

.Walks should be pitched with a continuous cross slope for water runoff.

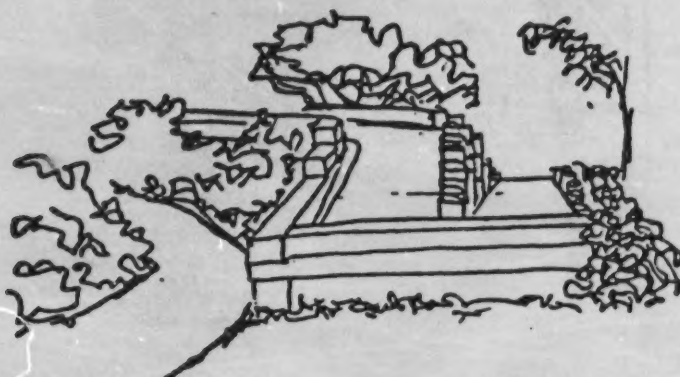
.Ramps should have a gradient not greater than 1:12 or an 8.33% maximum slope (recommended slope 1:20). Ramp runs should not be greater than 30 feet with intermediate platforms not shorter than 3'0" and stopping and turning platforms not smaller than 5'0" square.



- Open structured free standing ramps, where falls from ramps to ground are possible, should be equipped with handrails according to the following specifications.



.Ramps built into play hills should have a protective edge which adds to the richness and diversity of the play environment.



.Landings or platforms should be equiped with protective edging or railings.

.For short rises a slope of 1:7 is permissible with platforms every 15 feet.

(Dimensions from C.M.H.C. Housing the Handicapped.)

e) Fountains

.Some disabled children will dehydrate quicker than normal children, therefore drinking fountains should be provided for the use of disabled children.



Diagram: North Carolina Building Code

f) Entrance

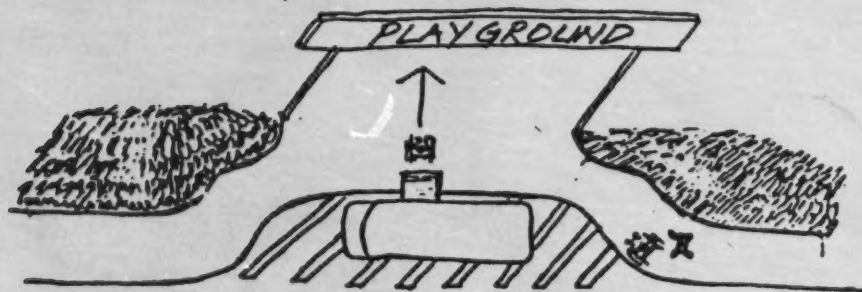
.Crosswalks or grade separations should be established where children must cross vehicular streets to gain entrance to playground.

.The entrance to the play environment should orient the child to the various aspects of the environment, either visually or via signs.



.Entrances should be provided allowing access to emergency and maintenance vehicles.

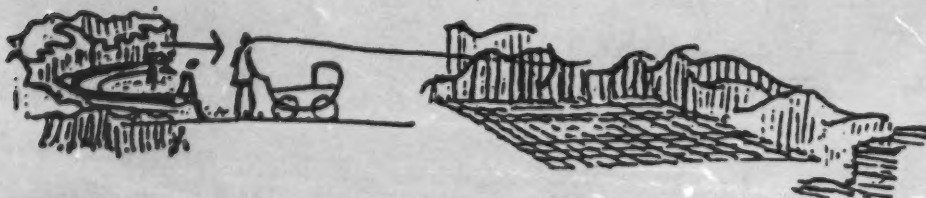
.A zone where children can safely be dropped off and picked up should be provided at the main entrance.



.Protective edging or railings should be established at entrances to stop children from indiscriminately crossing vehicular streets to gain access to playground.

g) Seating and Observation

.Seating areas should be provided where adults or supervisors can view activities of children. Comfortable seating areas near the entrances are ideal for this function.

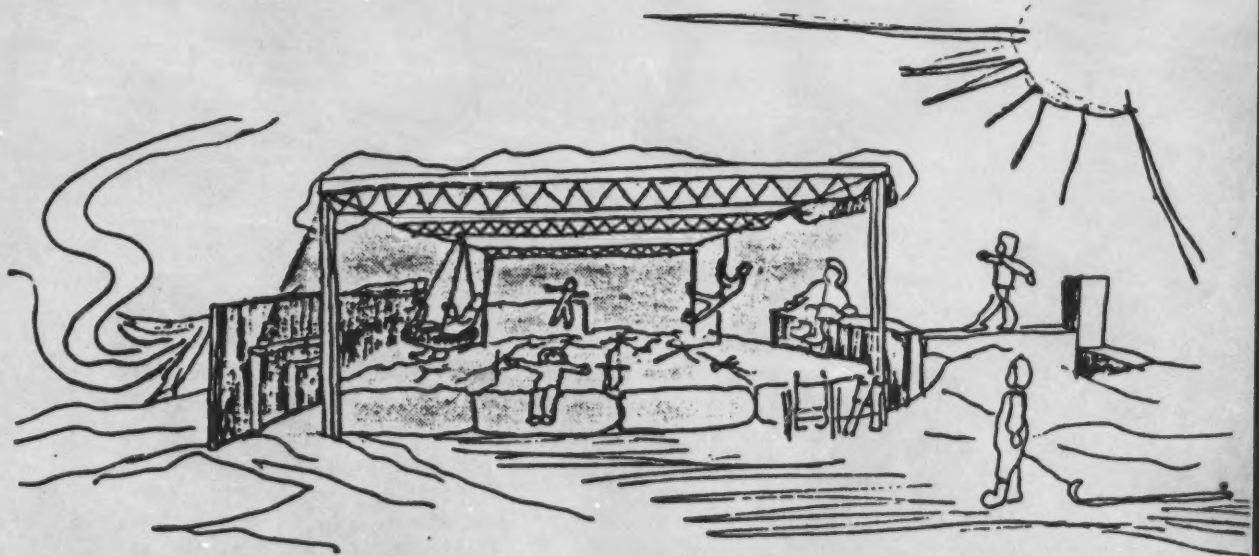


.Frequent rest areas and seating should also be provided for children. These areas should occur where the children can have unobstructed views of other children playing.



h) Shelter

- .Areas providing shade and all-weather shelter should be an integral part of the play environment.
- .Shelter from prevailing winds, sun and snow.
- .Shelters or space frames can be used to protect vulnerable play equipment, as storage for loose play material.
- .Enclosed heated play areas where activities requiring fine muscle dexterity (painting, modeling) should be provided.

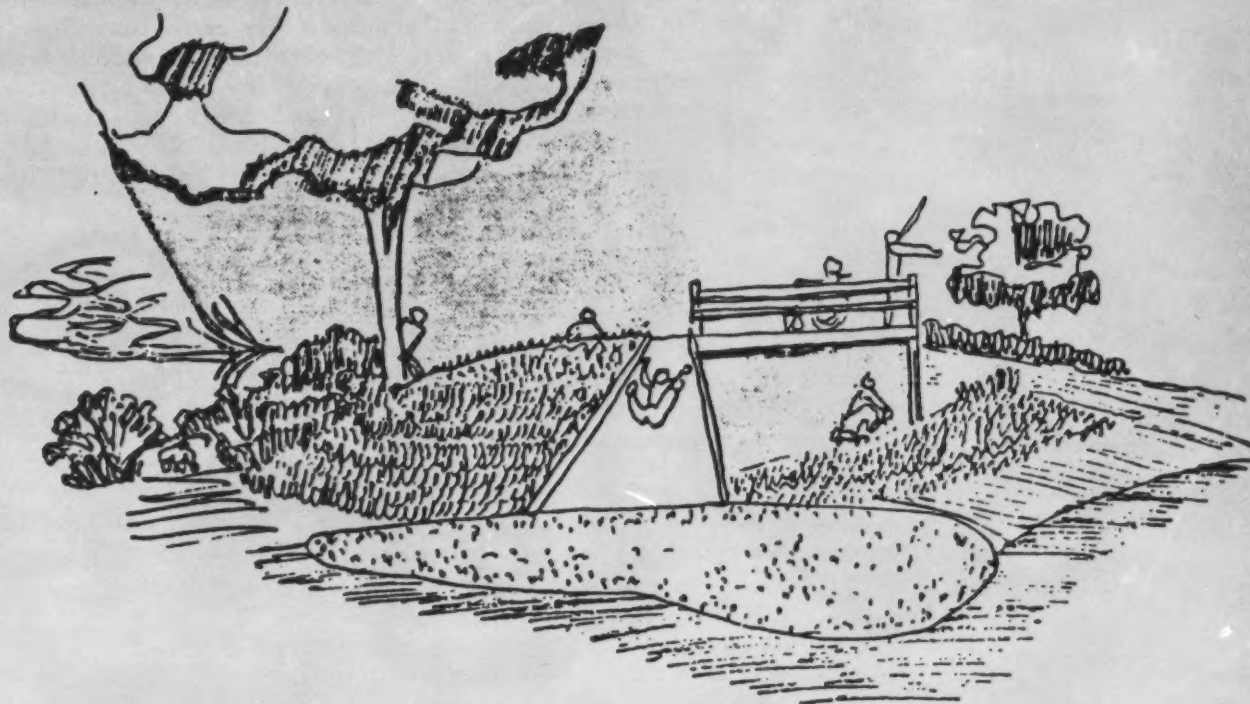


1) Washrooms

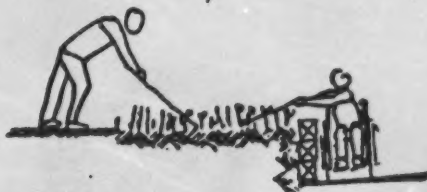
- .Indoor washroom facilities equipped to handle disabled children should be conveniently accessible from the play environment.

j) Plant Material

.The landscaping should blend the playground with the surrounding environment while providing shade, shelter, elements and spaces for playing in and around, screens and an interesting topography.



.Areas where children can cultivate plants might be provided.



.Plant material should be hardy species which are not harmful to the children. (See Appendix for partial list of common poisonous plants.)

k) Maintenance

.The area should be well maintained with any large cracks or heaves in the hard surfaces for wheeled vehicles fixed immediately.

.Materials that do not require constant replacement should be used.

.Community and children should be involved in the upkeep and involvement of the facility.

.Trash receptacles should be provided.

.Storage area for maintenance materials and gear should be provided.

5.4 PLANNING SPECIFICALLY FOR PLAY

This section examines some of the activities and elements that create the play environment. Through drawings, sketches and writing it intends to designate the activity's benefit to the child, special considerations in accommodating the disabled child and possible design solutions which may stimulate the reader's mind into offering alternative solutions. Simple but effective solutions should be developed to reduce both construction and maintenance costs. The elements and ideas depicted or suggested are only some of the possible ways in which play activities and the environment might be conceived.

The appropriateness of the ideas will depend on site selection, existing conditions, available finances, user groups and climatic conditions.

Some of the ideas exist already in specialized playgrounds built for disabled children, others are design notions resulting from the Playground for all Children competition and still others are conceptual ideas which need refinement in order to construct.

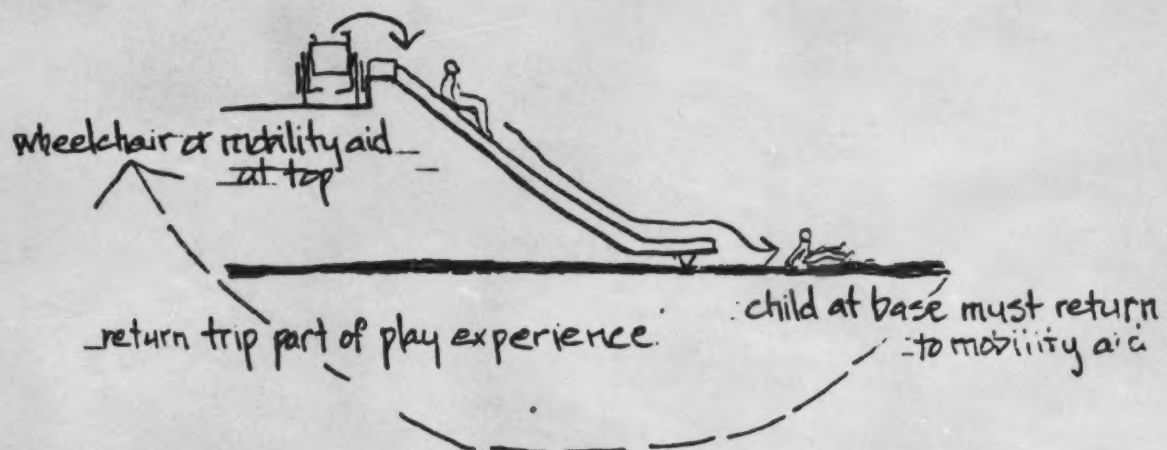
Physical Play

Sliding — to move smoothly along a surface.
— to slip along quietly.

Benefit to Child —

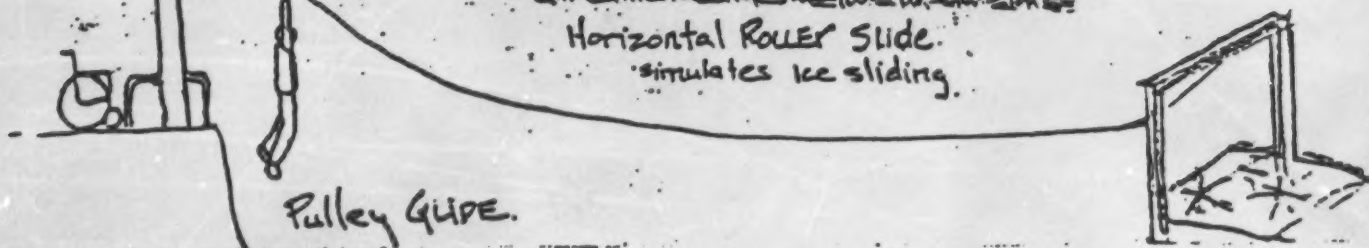
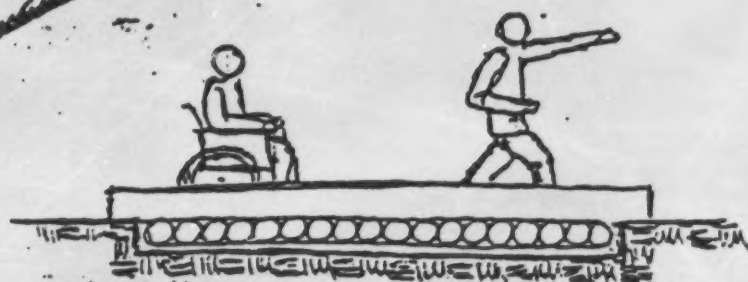
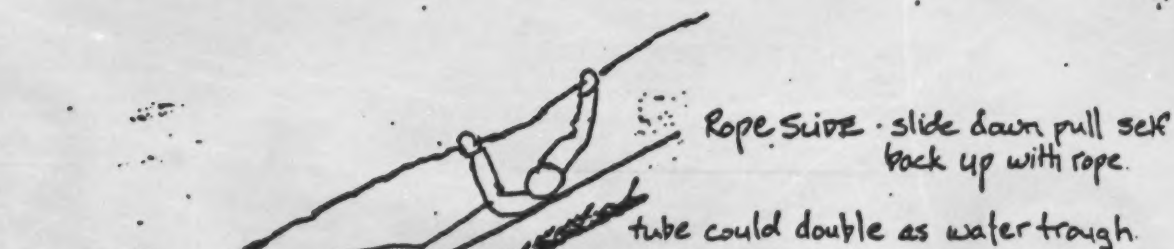
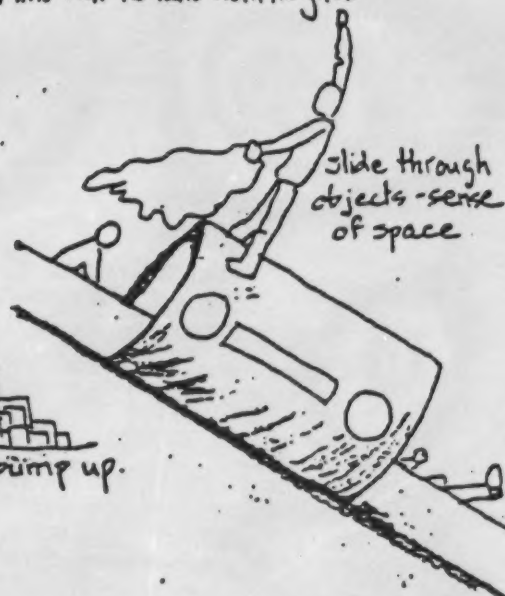
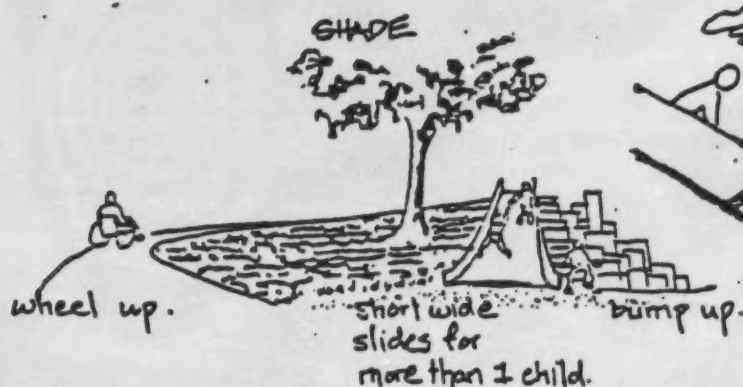
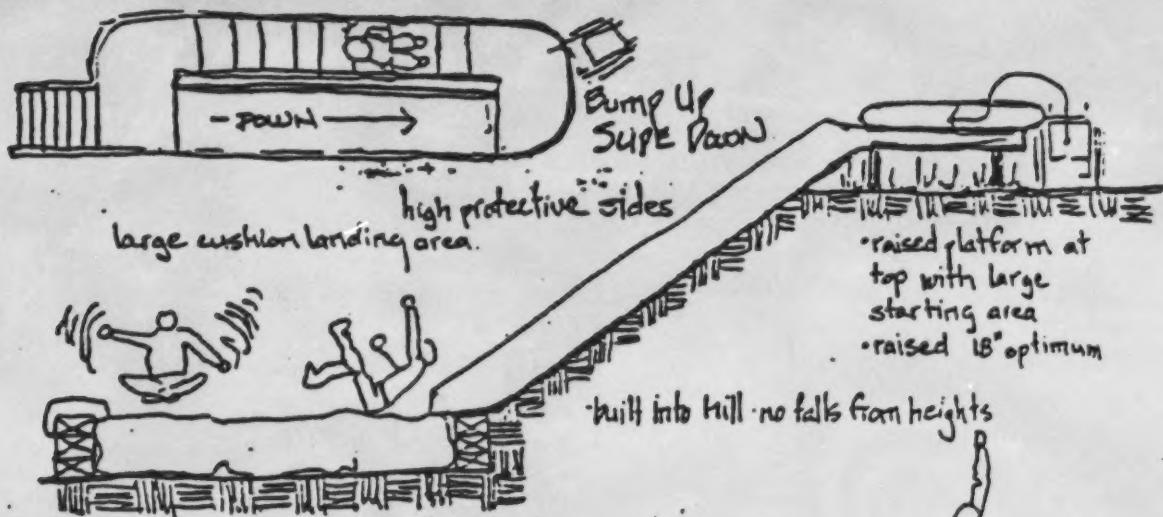
- . ramps and slides or various pitches can increase challenge and confidence.
- . sliding through objects can increase sense of space and body awareness.
- . a valuable activity link often juxtaposed with climbing.

Special Considerations — Often climbing and sliding are reciprocal actions, therefore they should be planned to respond to the needs of the disabled child without his mobility aid. Alternative access routes to the slide top should be developed for the child with and without his mobility aid. Problem: How to get child from slide base to slide beginning?



Safety —

- . a large scoop base or elongated landing platform can stop child from bouncing onto ground.
- . high side railing of 12 to 18 inches prevent children from falling over side of slide.
- . south facing slide surfaces should be avoided as they can get too hot.
- . slow down momentum built up from sliding from high heights by twisting or spiraling the slide.
- . slides built into slopes minimize danger from falls.



Climbing — to go up or down especially by use of hands and feet; to rise to a higher point.

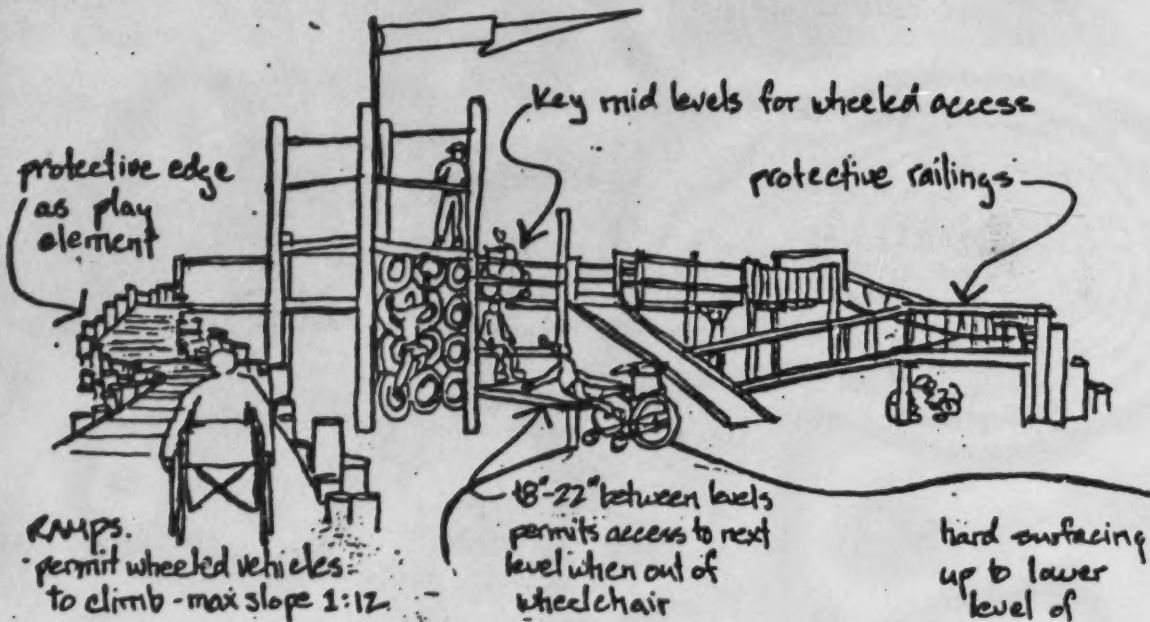
Benefit to Child —

- . development of gross motor skills and physical fitness.
- . limitless shape and materials of climbing structures and can provide a creative outlet when children construct them.
- . development of eye/hand co-ordination.

Special Considerations —

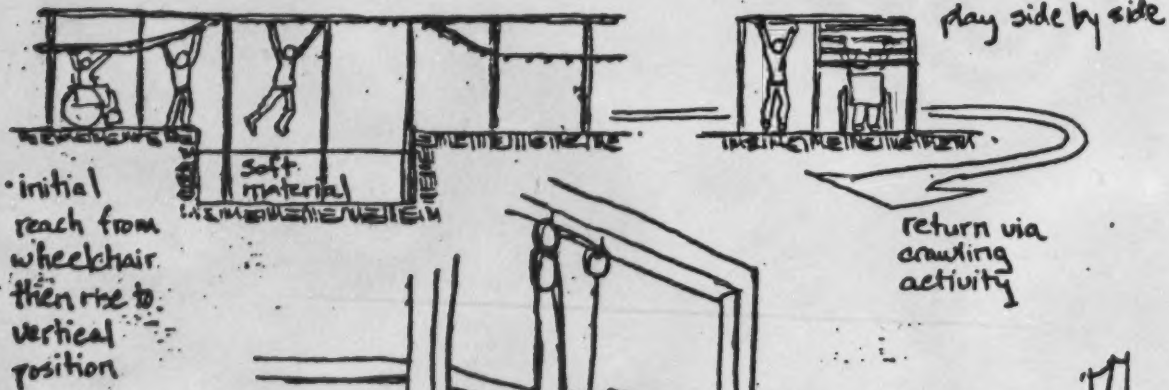
- . some disabled children lack the co-ordinated use of feet or grasping function of hands.
- . ramps of a maximum slope 1:12 allow wheeled vehicles to climb to key midway levels in the climbing structures from which a number of facilities can be reached.
- . hard surfaces up to the lower levels of climbing structures permits transfer from wheeled mobility aids to structure.
- . 18-22" between levels of climbing structure permits access to next level when out of wheelchair.
- . protective edges on ramps and structures could be railings or part of the play element.
- . ramp landings should be 6' square to permit turn-about of wheelchairs.

CLIMBING STRUCTURES



hard surfacing up to lower level of structure

HAND OVER HAND.



mechanical advantage through use of pulleys and ropes.



SEAT-PULLEY UP DEVICE.

Crawling — to move slowly by drawing the body along the ground.

Benefit to Child —

- . an action a great many disabled children can perform when out of their mobility aids.
- . enclosed crawl spaces can increase the child's knowledge of how much space the self takes, increasing body awareness and height judgement.

Special Considerations —

- . surfaces should be smooth so not to injure hands, knees or other parts of the body.
- . surfaces should not retain heat and not face south.
- . surfaces should be weather resistant.
- . surfaces might offer grasping devices by which a grip can be taken to pull oneself along. Footholds might also be considered to aid in the activity.
- . nets offer both grasping and foothold possibilities.

Possible design solutions:

LEVEL PLATFORM CRAWL - hand holes provided



LINKING FACILITIES

easily constructed mounds

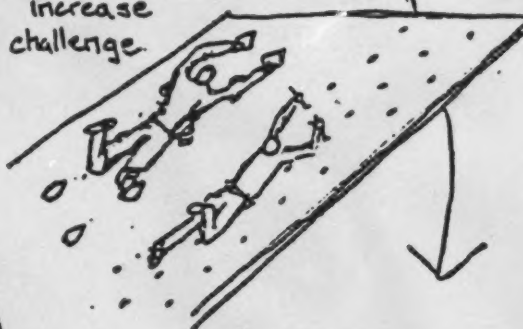


CLIMBING BOARD

- rope grip
- foot or toe holds



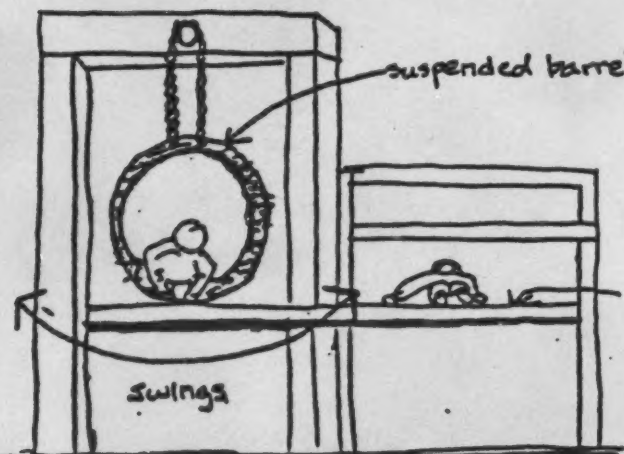
Variable pitch can increase challenge



STRAP + PEG CRAWL

- help develop eye/hand coordination
- develops upper body strength - especially in arms
- coordinate use of all muscles of body in crawl action

suspended barrel



platform crawl back

Swings

could be part of climbing structure or handi-trail

BARREL CRAWL



Swinging -- to move rapidly back and forth in an arc.

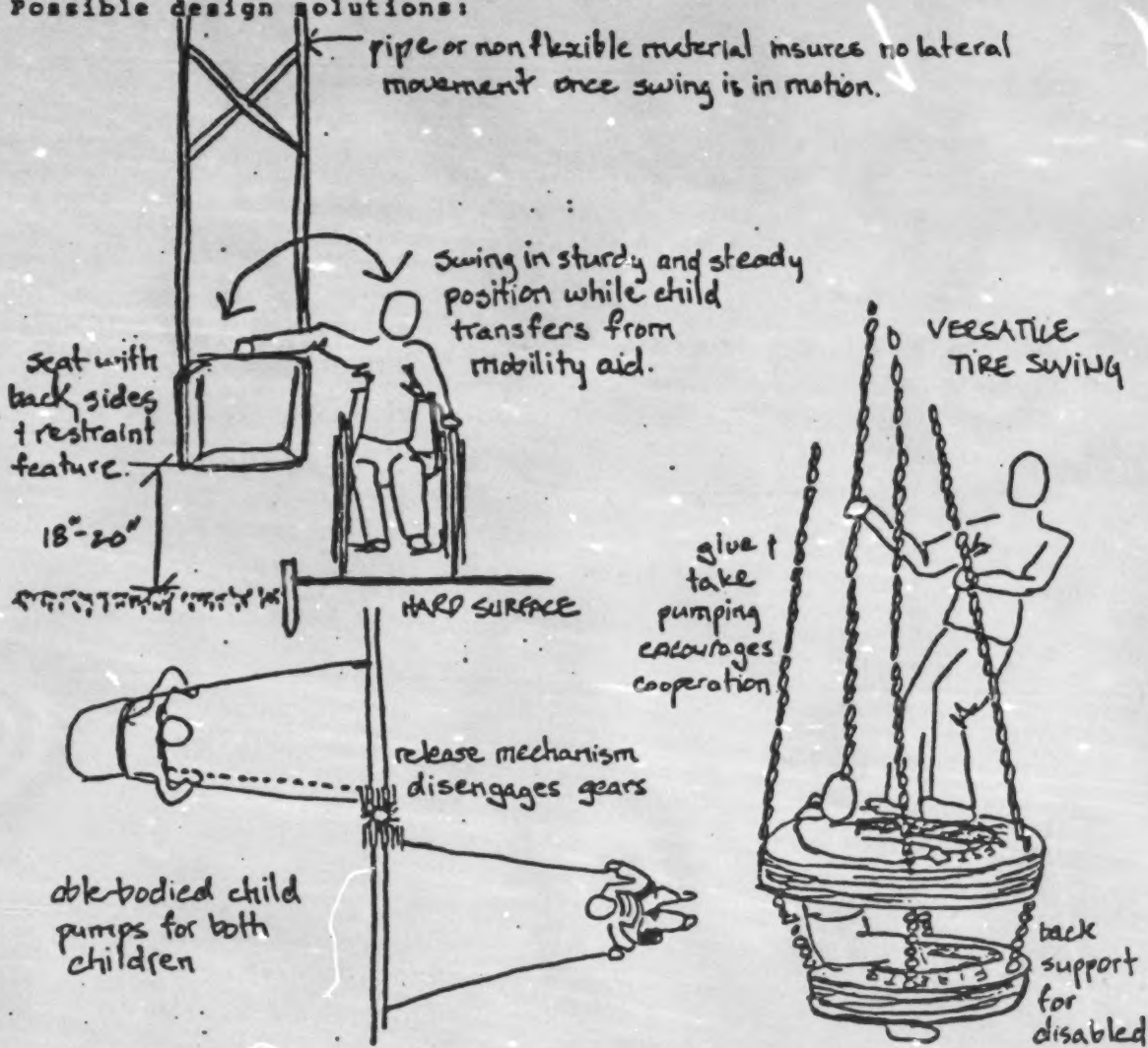
Special Considerations --

- . four criteria to realize for disabled child to swing:
 - 1) child must be able to mount swing apparatus,
 - 2) alternative methods to put swing in motion,
 - 3) braking of swing,
 - 4) dismount and return to mobility aid.
- . wheelchair swings--wheelchairs must be fastened securely by a fool-proof device.
- . propulsion can be difficult due to combined weight of child, chair, support platform and structure.
- . braking also a problem due to combined support.
- . the structures are elaborate and expensive for only one use.
- . better for children to swing out of confines of mobility devices.
- . wheelchairs swings are good ideas only for those children who are confined to a wheelchair.

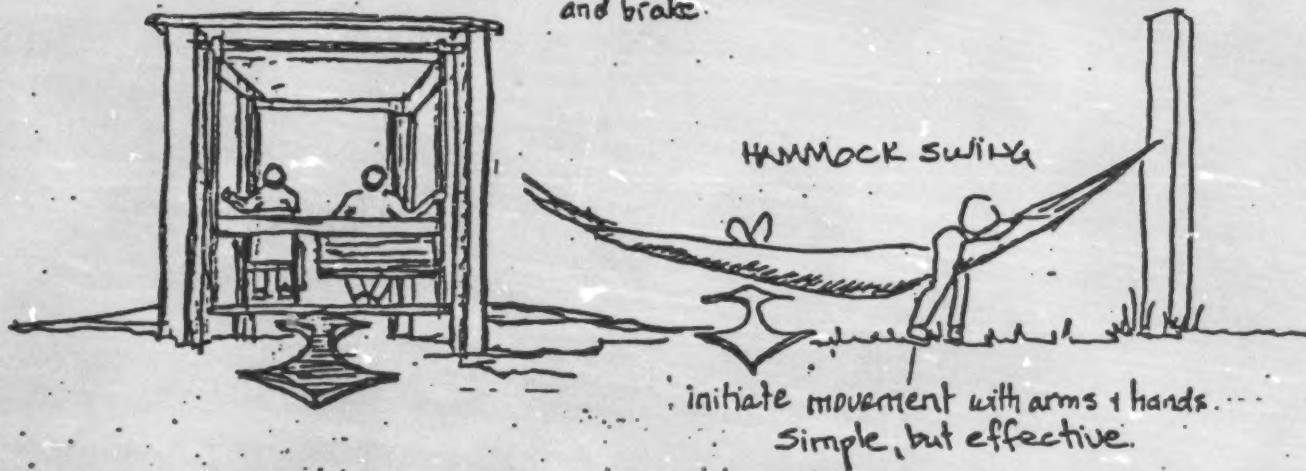
Safety --

- . seats must have back and sides with restraint features.
- . seats should be constructed from a soft material.
- . when transferring swing seat must be sturdy and steady in a locked position.
- . if mobility aid is left near swing, swing must swing in a true arc with no lateral movement.

Possible design solutions:



WHEELCHAIR SWINGS, expensive, hard to propel and brake.



Bouncing -- a rebound or reciprocal action brought about by an object in motion contacting another causing a reverse in motion.

Benefit to Child --

- . motion in space—dropping and landing.
- . the reflexive movements of the body sending kinesthetic information and tactile information via proprioception for a safe and soft landing.

Special Considerations --

- . safety -- sand and soft landing materials should be employed as well as padded or protective edging.

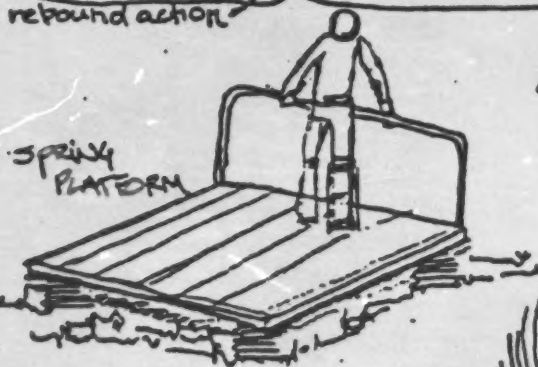
Balancing -- maintaining an equilibrium.

- physical equilibrium between two objects.
- an inner equilibrium involving one's own balance.

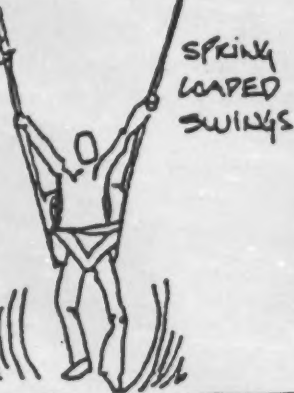
Benefit to Child

- . a sensation which can be experienced in and out of mobility aids.
- . balance while out of mobility aid helps the child become more acutely aware of his own weight and body balance.

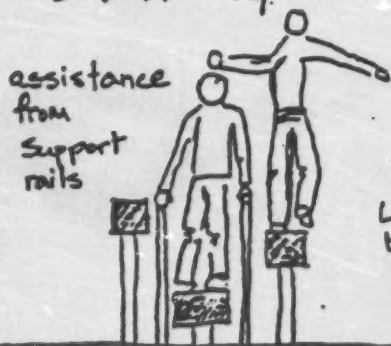
BOUNCING - INFLATABLES, TRAMPOLINES



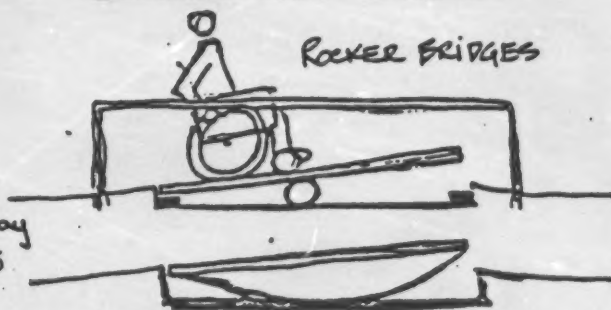
GIANT BOUNCING BALLS.



BALANCING

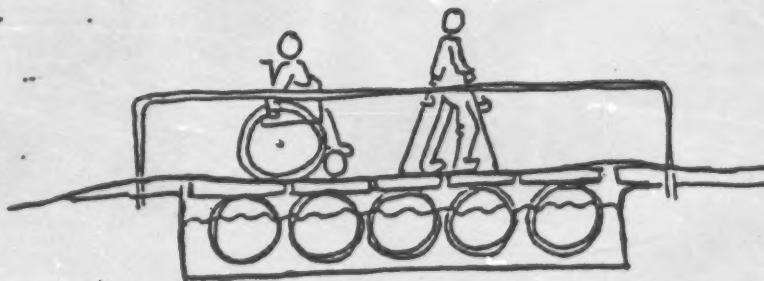


LINKS.
become play
elements



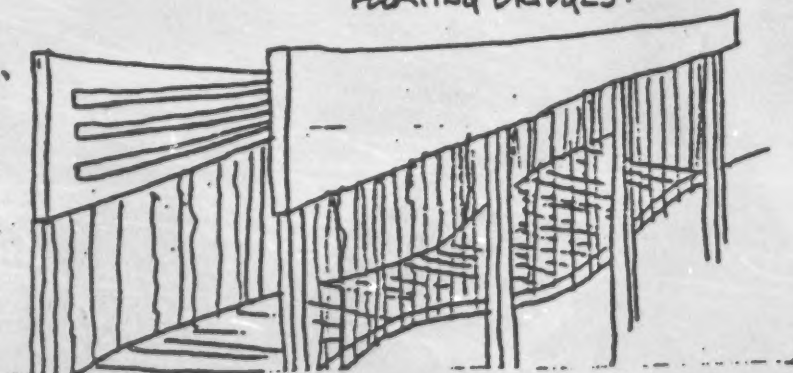
BRIDGE DECKS - dynamic balance

ROCKER PLATFORM



FLOATING BRIDGES.

bridge swings + sways
- helps child develop
walking coordination
and balance



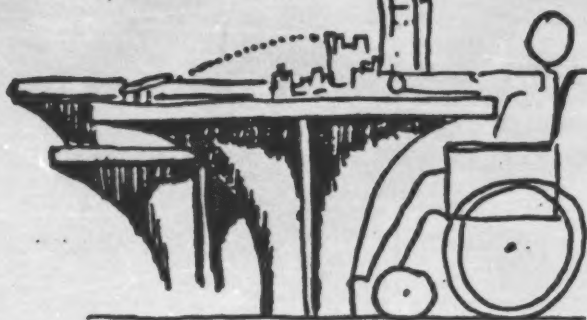
Creative Cognitive Play

Sand — a creative manipulative medium for group or individual play. When in combination with water and loose parts the play is limited only by the child's imagination.

Special Considerations —

- . raised sand tables permit playing while seated in wheelchair or from other mobility aids.
- . raised sand areas should have differing heights to accommodate the differing heights of wheelchairs—tabletop heights should vary between 24"-32".
- . indentations in edge of raised areas can increase reachable play space to sides; indentations should be 26"-32" wide.
- . a table width or diameter of 48" permits children to play across from each other (arm reach while seated in wheelchair is approximately 24").
- . sand box edges should provide the opportunity for the disabled child to dismount and bump to sand area or to mount his wheelchair.
- . wedge edge permits playing on stomach while encouraging head control and extended arm action.
- . sand play areas should be situated so that prevailing wind does not blow sand into the faces of children playing.
- . shade should be provided in sand play areas as sand can get extremely hot in summer.

SAND TABLES



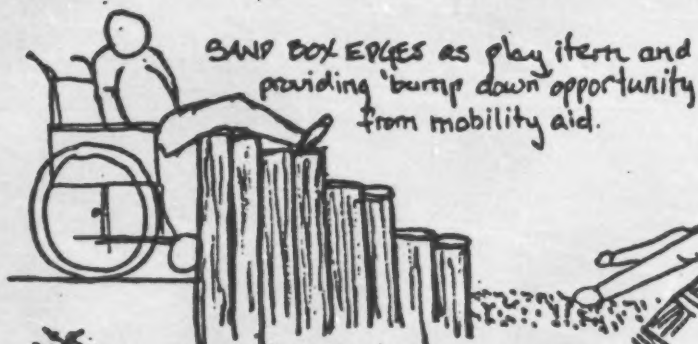
tables at differing heights
21" - 32"

water trough
in sand
table

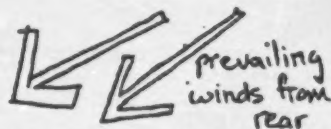


modular design permits
addition or subtraction
as demand dictates.

indentations for
wheelchairs - 26" - 32" wide



SAND BOX EDGES as play item and
providing 'bump down' opportunity
from mobility aid.



prevailing
winds from
rear

WEDGE EDGE

play on stomach while
encouraging head + arm control
providing back support while
sitting

SHADE trees, trellis, buildings,
fences.



LOOSE PARTS + CONSTRUCTION - sand bags, planks, blocks, crates
spools, tires, pulleys, cables

Water — a valuable play medium because of its versatility.

- properties: wet, cooling, refreshing, reflective, flowing motion (fast, slow, dripping, torrent), auditory quality (soft and soothing, roaring).
- can be introduced in the form of: fountains, ponds, pools, streams, sprinkler/sprays, controlled source (hand pumps/faucets), troughs, ice.

Benefit to Child —

- . controlled output—child can control output and can see result of pumping action (operated by hand or feet).
- . in natural ponding situation child can learn about nature seeing growth of emergent vegetation and viewing amphibious wildlife.

Special Considerations —

- . permanent or moveable water troughs could carry water near to areas where plants or garden plots are.
- . trough heights should vary to accommodate differing heights of mobility aids—heights should vary between 24"-32".
- . water ponds through which wheelchairs can drive should have a hard surface bottom so wheels don't get bogged down.

CONTROLLED OUTPUT

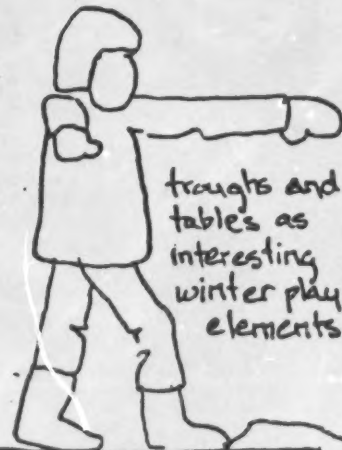


water troughs to carry water to plants, garden plots and sand play area

WATER TABLES AND TROUGHTS
Variable heights
24"-32"



table notches for wheelchairs

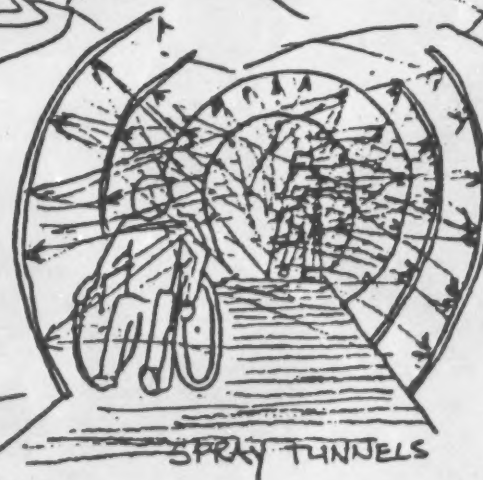


troughs and tables as interesting winter play elements.



shallow pools to drive wheeled vehicles through.

COOLING.



SPRAY TUNNELS



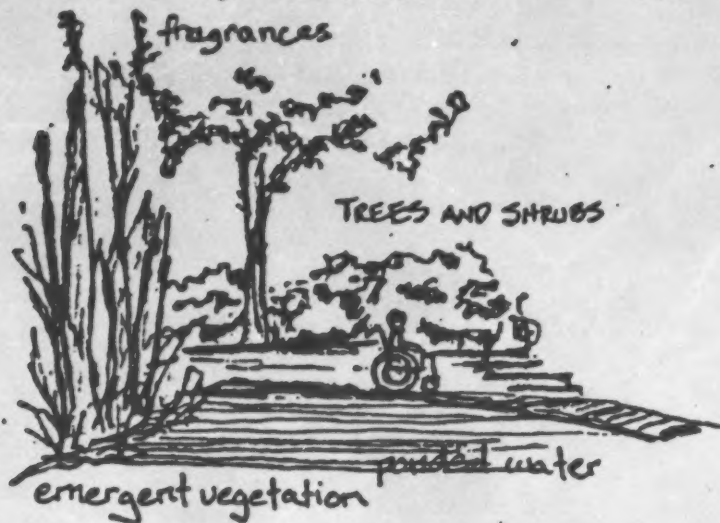
SQUIRT GUNS - pump with hands or feet - force of squirt related to pump :: child is rewarded for effort.



Sensory Stimulation — elements in the play environment evoking reactions from the senses.

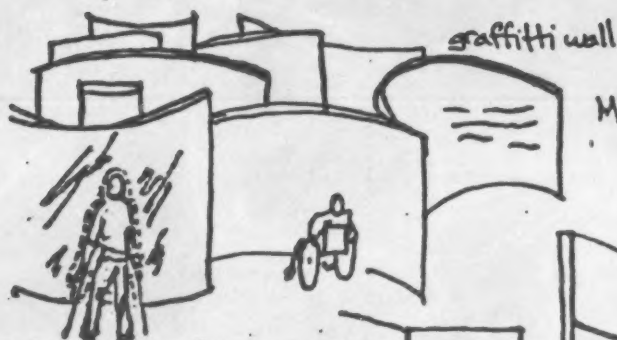
Benefit to the Child —

- . the opportunity to make decisions and test out their consequences in a controlled situation.
- . discovery, experimentation, creation, testing, concluding.
- . sound — creative/primitive sound/banging items.
 - melodic/soothing.
 - loud/release.
 - rhythmic/inbred beat/gets body in motion.
- . heat — learn about heat and fire by making use of it.
- . smell — use of fragrant plant material to stimulate olfactory sense; compost heaps, herbs, vegetables and flowering plants.
- . tactile environment — occurs as part of the built play environment from all the different materials used in the construction.
- . sight — reflective surfaces; visual images of body, can learn from self-observation.
 - use of vibrant colours, numbers and letters to stimulate activity.



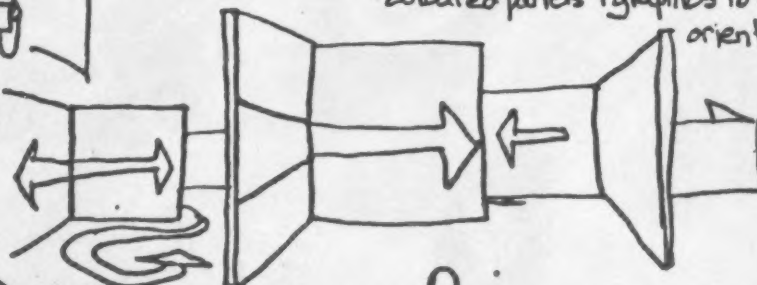
TACTILE TUNNEL

- different surface finishes
- space and body awareness



- visual images of body
- learn from self observation.

- ### MAZES
- test sensory-motor integration
 - directionality • laterality
 - perception • motor patterns.
 - coloured panels + graphics to aid orientation



- ### DRELS
- to bang - use also for storage, separation of facility



Social Play

Court Sports — an important aspect of the play environment as court sports encourage socializing and competition along with participation in a regulated and orderly manner.

Benefit to Child —

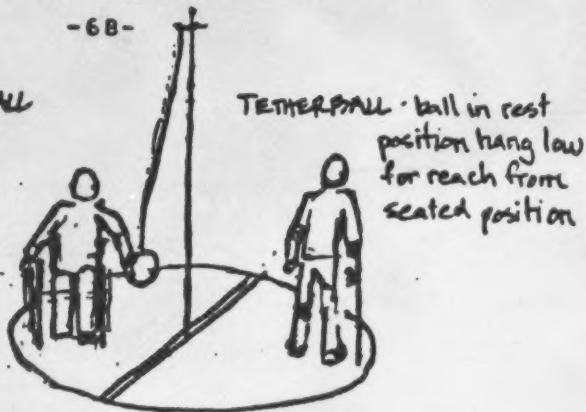
- . field days provide a variety of activities where the disabled child can participate or compete against the clock or another form of measurement. Here a judgement of past performance can be used to encourage the child for a new personal best.
- . eye-hand co-ordination can be increased through throwing, catching and hitting objects.

Special Considerations —

- . most court sports can be adapted for use by disabled persons, however care should be taken so that the rules are not altered such that the able-bodied children find that the game has lost its excitement and competitive edge. Other times the numerous rules and fast action can make it unrealistic to have disabled individuals and fit individuals on the same court.
- . if competing against able-bodied children then time or distance handicaps can be arranged.
- . a variety of ball types should be available so disabled children can grasp and throw them—different sizes, weights, materials ("nerf" balls, foamies, bean bags), and styles (balls with finger holes).

Possible design solutions:

-68-

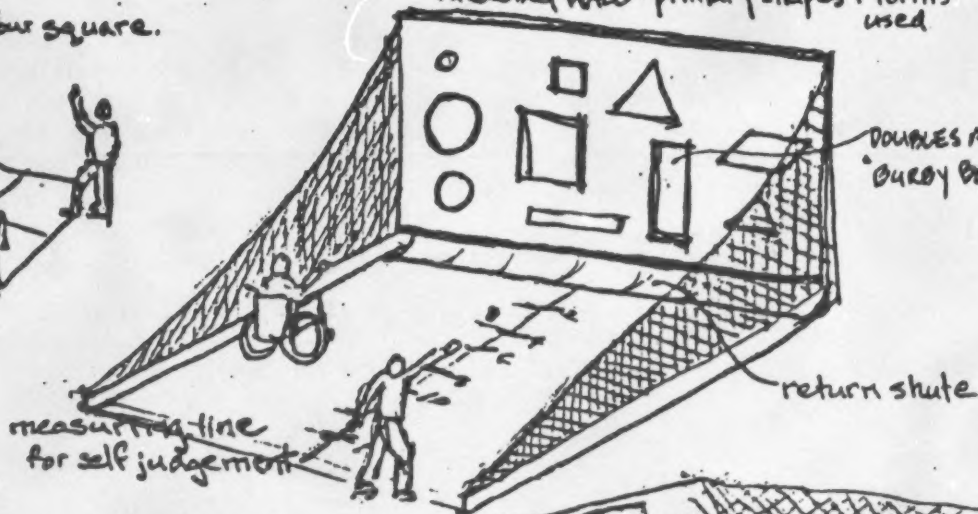


ACCURACY / EYE-HAND COORDINATION

Social play - Four square.



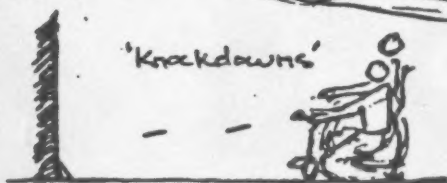
THROWING WALL - primary shapes + forms used



FIELD DAYS - javelin, shot putt, relay races archery.

PICK UP GAMES

'Allics or Marbles'



ELEVATED BROOMBALL.

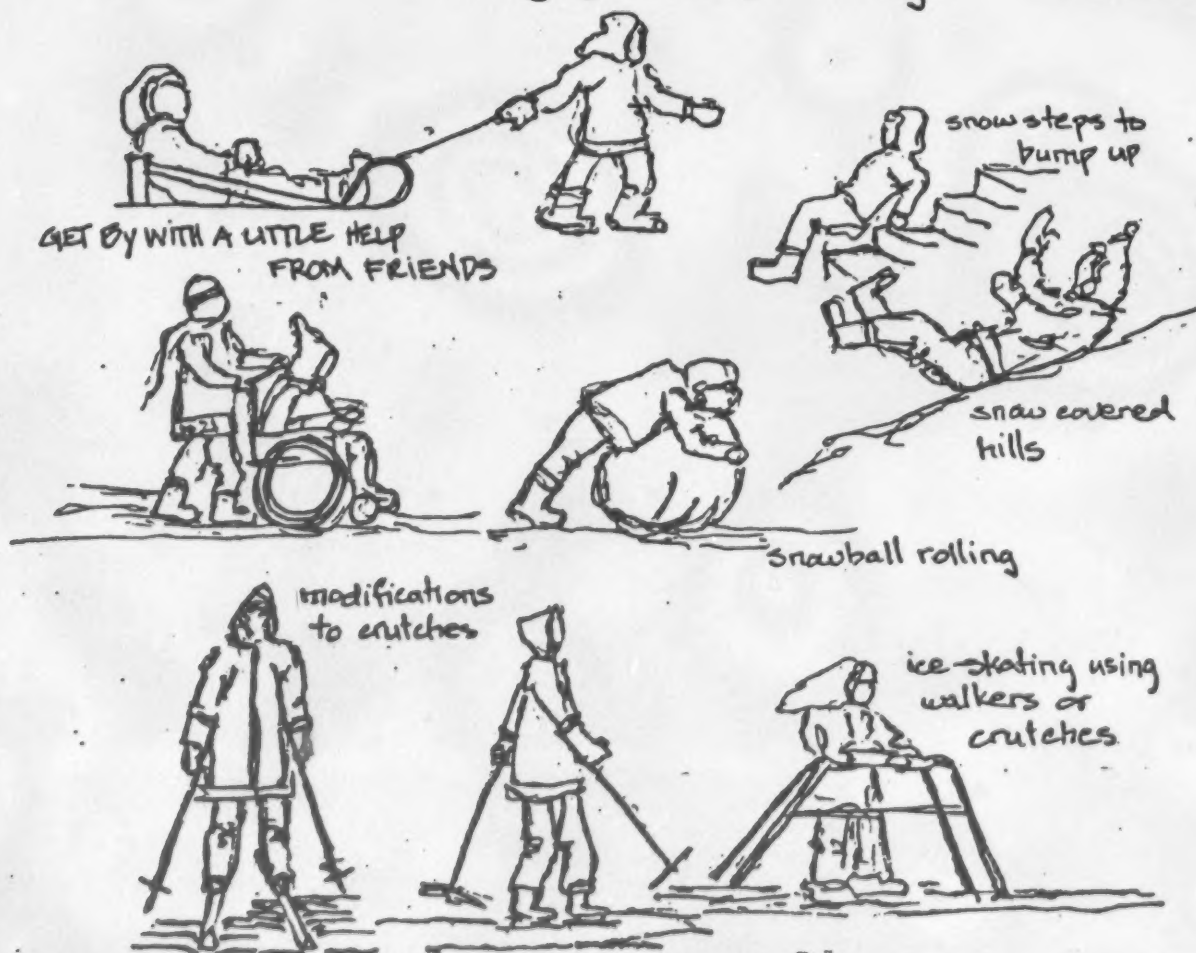
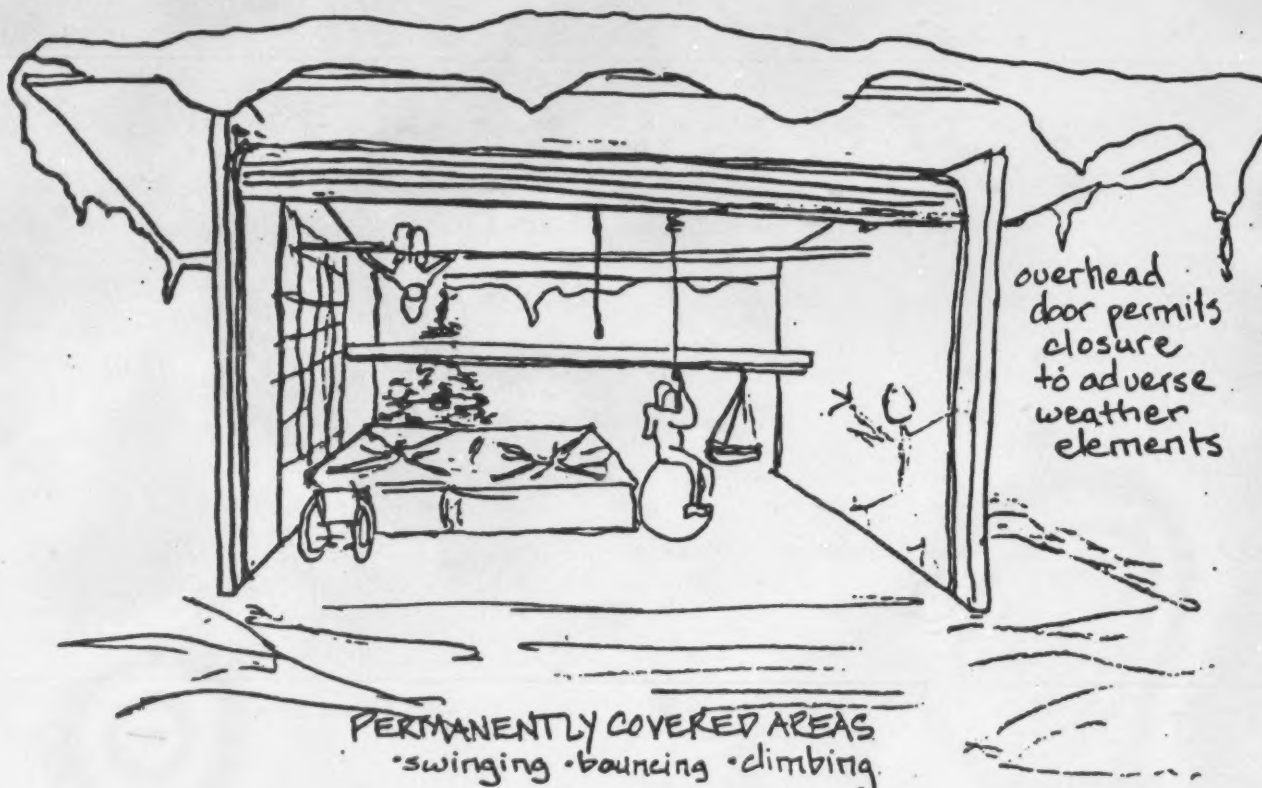


Winter Play

- . while not strictly a social play activity, social play can increase as disabled children tend to rely greatly on peers for assistance as playing outdoors in winter for disabled children can be frustrating.
- . snow covered ground makes the use of conventional mobility aids difficult.
- . coldness a problem due to lack of mobility and inactivity.
- . time consuming process of dressing appropriately for the elements when only short play time is available such as a 15 minute recess.
- . due to the above factors most disabled children do not play outdoors in winter.

Special Considerations —

- . increased maintenance cost and labour to keep playground walks clear of ice and snow. The use of the playground should justify these maintenance increases.



Wheeled Play — for the disabled child who depends on wheeled vehicles for a major portion of his mobility, this aspect of the play environment becomes important in the physical, social, and creative activities.

Benefit to Child —

- . the disabled child should be encouraged to use unconventional mobility aids to circumnavigate the playground.
- . a handi-trail or fitness trail can link the various areas and play elements of the play space while combining physical fitness activities into the route.
- . signs and surface markings along a smooth surface circulation system could increase a child's knowledge and awareness of traffic rules.

Special Considerations —

- . curbs or guards must be installed on paths where wheeled vehicles are to travel.
- . handrails should be installed where falls from equipment may occur.
- . open, flat hard surface areas can be used for a variety of activities.

UNCONVENTIONAL WHEELED ITEMS



tire and castors



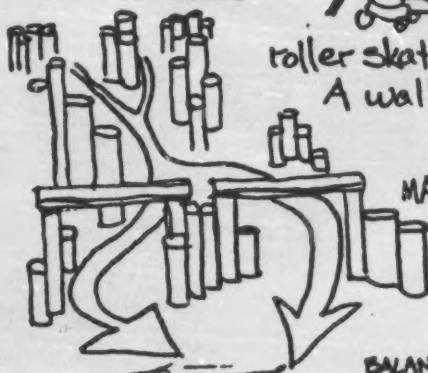
oversized
castor
cart

items close to ground,
easy for disabled to
mount and dismount.



roller skates and
A walker

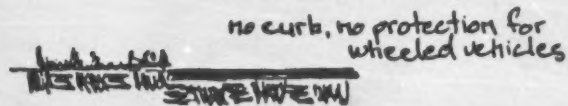
SLALOM COURSES



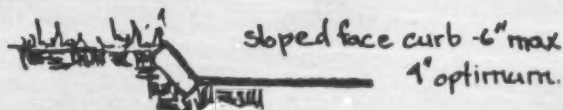
MAZES



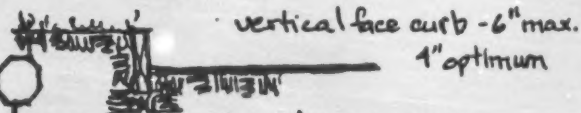
BALANCING



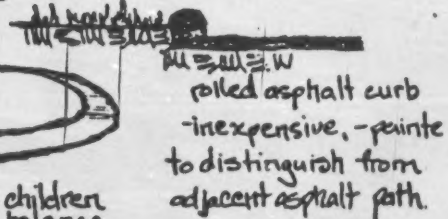
no curb, no protection for
wheeled vehicles



sloped face curb - 6" max
1" optimum.



vertical face curb - 6" max.
1" optimum



rolled asphalt curb
-inexpensive, -painted
to distinguish from
adjacent asphalt path.

undulating path.



ambulant children
walk and balance
on top.



HAND OVER HAND



BARREL CRAWL



SKATE BOARD TRACK

HANDI-TRAIL



• Scooter boards, castor carts
sit down skateboards.

6. A Winnipeg Case Study

In Winnipeg there are a number of institutions which have a population of handicapped children. The St. Amant Centre in St. Vital is a domicile institution for mentally retarded individuals. The Manitoba School for the Deaf is also a residence-institution and school with a substantial population of "bused" individuals. Both these centres are specialized and concentrate their resources in a specific field.

The Health Sciences Centre in Winnipeg is the focal point of medical practice and research in the province. The centre's many departments and affiliates cater to a large transitory population of handicapped children. Patients who attend the occupational or physiotherapy departments; in- and out-patients of the Children Centre, the Rehab Centre, and the pediatrics department as well as the close proximity of the Society for Crippled Children and Adults, the Canadian Paraplegic Association and the Manitoba League for the Physically Handicapped all constitute a portion of the handicapped population concentrated in the area.

A number of schools also have a percentage of handicapped children in their population. Robertson Elementary School has 40 trainable retarded individuals in attendance. At present Lord Roberts Elementary School is the only primary school institution providing integration of disabled children and able-bodied children through a normalization program. There are approximately 45 disabled children in attendance at the school, with a total population of close to 600 children.

Thus, the demand for a playground that will accommodate disabled children is present in the Winnipeg area. The development of new play environments which are sympathetic with the specialized needs of the disabled individuals or the adaption of existing play environments could help to fill this demand.

6.1 SITE SELECTION

The Lord Roberts site was selected as an exemplary site for this study as the school was the only institute presently dealing with the integration of children suffering from a number of different handicapping conditions in the elementary grades one through six. While recognizing that there are differences when setting up a neighbourhood play space, the Lord Roberts site offers an easily identifiable user group as well as the opportunity to indicate how existing facilities might be altered to accommodate the disabled child.

The users of the site are both able-bodied and handicapped children of various capabilities. The handicapped children are integrated into the normal program of the school except for "in-school" occupational and physiotherapy sessions.

The school is built on one level except for the major gymnasium which is down a steep flight of stairs. Thus, the children are capable of self-locomotion to all classes except physical education. Some of the more ambulant handicapped children are allowed to "bump" themselves down the stairs to the gym to take part in the activities.

At Lord Roberts School there are two definite outdoor play areas. One, located at the west end of the school, is a small area strictly for the kindergarten children. The major playground is located at the east end of the school and contains large asphalt areas, playing fields, earth mounds and a commercial climbing play structure. The disabled children are primarily constricted in their use of the playing yard to the asphalt areas. The flat character of the playground reduces any costly constraint to providing access for the disabled child to existing facilities. However, the design of existing facilities and the contouring of the earth mounds present opportunities to show how these can be adapted to accommodate the disabled child.

There is no protection within the playground's perimeter fence against the climatic conditions. Shade, wind breaks, sun traps and cooling water facilities do not exist. Access from the surrounding neighbourhood is less than adequate, however small inexpensive changes could remedy this problem.

The school is also an ideal site as complementary support facilities currently exist, including indoor play areas, toilets, drinking fountains, equipment storage, busing service and professional services during school hours.

A questionnaire was circulated amongst the handicapped children to gain an understanding of their activities, perceptions and aspirations in the Lord Roberts playground and any playgrounds near their home. The parents and teachers of these students were also queried for information regarding present playground design and improvements that might be made.

The questionnaire revealed that while most of the handicapped children were excited about the existing play structure and hills, they were disheartened by the inaccessibility of these elements. The children's

answers also pointed out the fact that in winter they rarely play outside because it's hard to get around and it's too cold for non-active play. They also stated that there are few places for them to play around their homes and if there are they must be accompanied by an older individual who can assist them in the use of the facilities.

All the handicapped children stressed the desire for play equipment which allowed them to swing, slide and balance or sand boxes, tunnels and climbing structures to stimulate their imagination. Basically, the handicapped child wants to partake in the same playground activities along side fit children.

Parents and teachers stated that for the majority, outdoor play equipment was not available for use by handicapped children at the ground surface or the construction of the facility made it inaccessible, not safe, or not adaptable to the special needs of the handicapped.

6.3 DESIGN CONSIDERATIONS

The design develops a circuitous hard surface path system that affords those children using wheeled mobility aids access to different areas of the play space. Areas have been designed for physical activities, creative cognitive play and social play. As well, with the introduction of plant material and built features offering hideaway areas, individualistic and quiet retreat play can evolve.

Through a series of hard surfaced pathways, ramps and bridges the child is introduced to water and sand elements, both at table top height and on the ground. Access to low wide slides, alternative routes over or under climbing structures, amongst loose parts and through areas offering court sport activities are also presented.

The main entrances to the playground have been made wider, with the southern entrance providing a drop-off zone for a handi-bus. Views of the facilities within the playground are afforded from the entrances. The south entrance offers a stage and amphitheatre area where outdoor classes may take place or where parents may relax while children play.

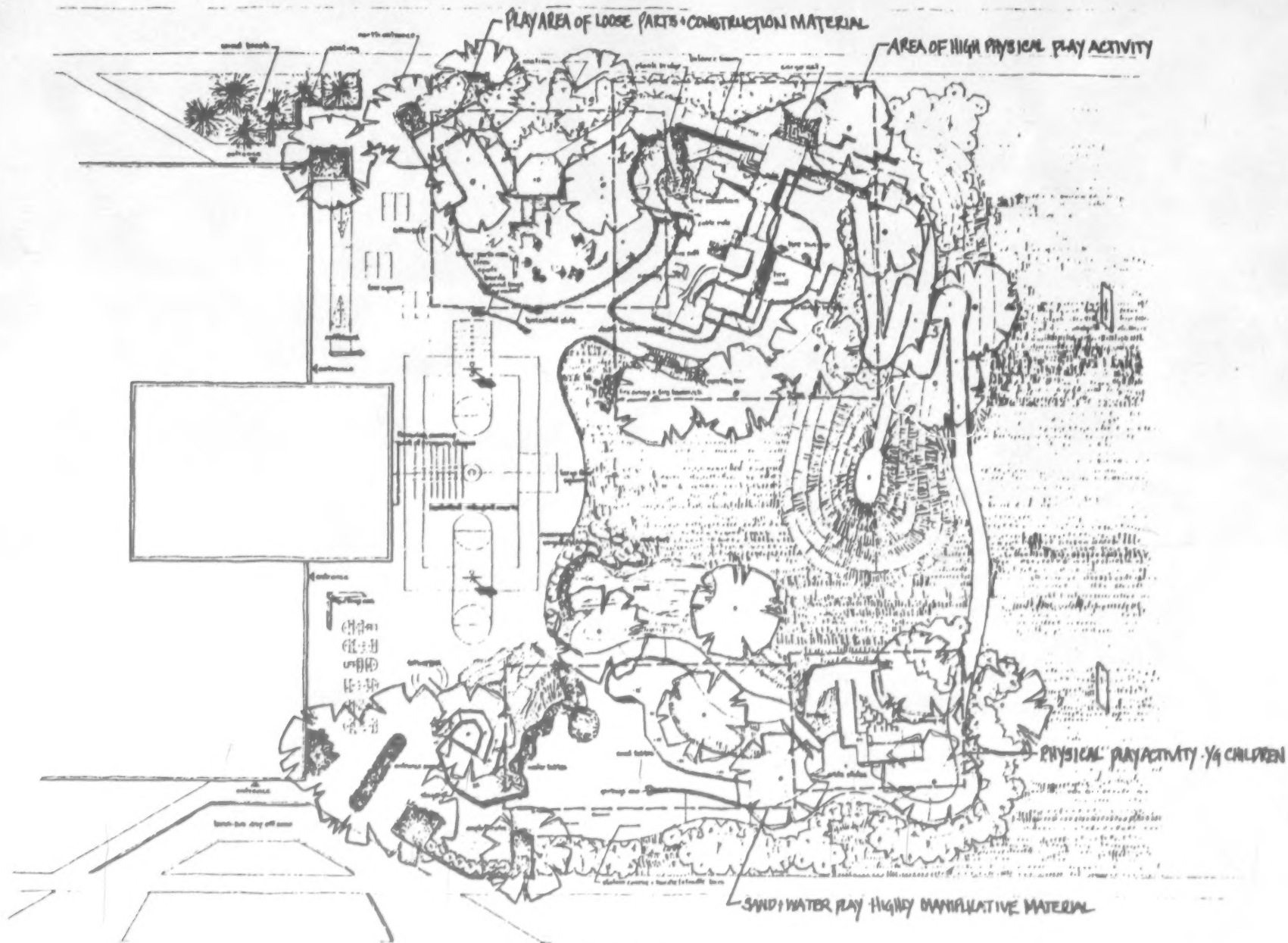
A switch-back path system has been developed through the mound so that a child may traverse it, climb to its pinnacle or link to the climbing structure.

The climbing structure itself has been altered to provide lower level access by abutting paved areas and then a series of bump-up platforms leading to facilities. The north end of the climbing structure is accessible from wheeled mobility aids from the five foot platform. However, as the desire to make use of facilities located on or around the climbing structure increases, so does the challenge to reach those facilities (example: the slides at the south end of the climbing structure have 4 and 5 transfers from platform to platform between mobility aid and slide beginning; whereas the tube slide to the north has only 1 transfer between its beginning and the wheelchair). Many facilities within the climbing structure area abut or are in close proximity of each other so that a child out of his mobility aid can reach a number of play items and through linking these play items return to his mobility aid.

A bridge and path link the physical play area to an area of loose parts where modular framing permits the construction of their own huts by the children. A plethora of boards, spools, tires, boxes should be supplied so the child can create his own world and play space.

A large area of asphalt has been retained with a number of items such as tetherball, four square pitches, shuffleboard, adjustable basketball hoops and a pitching board all being accessible to the disabled child.

The circuitous path system does not only make access to the various parts of the play yard possible, it is also a play system itself, a handi-trail with a number of exercise/play items which both able and disabled children can make use.



6.6 GUIDELINES: PRIORITIES FOR IMPLEMENTATION

The design proposes a viable, innovative play space to accommodate disabled children. Naturally, it includes a number of elements and changes to enrich the present play space for all children. However, the success of the play space does not rely on the exact replication of the play environment as illustrated in the site plan. Rather, a number of priorities or elements can be identified within the design which would alter the existing Lord Roberts play environment in order to accommodate the disabled child. Many of the changes specified could be made to any existing play facility in order to accommodate the disabled child.

Those crucial elements of the design which would enable disabled children to use the play space are as follows:

- 1) The handi-bus drop-off zone — an essential area where the handi-bus can pull completely off the road and drop the disabled children near both an entrance to the school and the primary entrance to the school yard.
- 2) Accompanying the handi-bus drop off zone would be a broadened entrance to the playground. The existing 6 foot opening would be widened to 20 or 25 feet. Safety control fences and crosswalk facilities should also be added.
- 3) A hard surface path system is vitally important for use of the play space by disabled children. The path system need not be circuitous initially but rather, should lead to the present facilities of the playground: the slides, climbing structure and sandbox.
- 4) Modification of wide slide hill and mounts to enable mobility aid access to the slide origin, complete with raised starting platform, handrails and a "bump-up" structure built into the existing hill.
- 5) A raised portion of the sand box area which makes it accessible to disabled children in wheelchairs.
- 6) Accompanying hard surface access to selected areas of the climbing structures should increase the size and number of lower levels (i.e. 1 1/2 ft.) which abut the hard surface, permitting transfer from mobility aid to climbing structure. It is not necessary to immediately provide wheeled vehicles access to upper levels, but this should be considered so as to permit participation by severely disabled children. Returning to mobility aids is also considered important in the adaptation of the climbing structure, therefore, curving slides towards the base of the structure or additional "bump-up" facilities, climbing nets, and soft landing pads are crucial.
- 7) The introduction of mild undulations to existing paved surfaces can make the area more interesting for wheeled vehicles close to the ground.
- 8) The introduction of plant material is deemed a priority. Evergreens provide windbreaks while fast growing deciduous trees such as Manitoba maples provide important shade and extra climbing facil-

ities. The addition of plant material can bring about the definition of exterior spaces, dictate movement and add a diversity to the play yard which currently does not exist. Initial plantings need not be large caliper trees. Protected whips which will mature with time can suffice.

- 9) Changes which are not necessarily priorities but rather quick, low-budget adaptations to the present play space, are the addition of surface markings on the hardtop. Markings for shuffleboard which is useable by the disabled or lines demarcating distance for self-judgement are useful as are painted targets on the vertical surfaces. Lower basketball nets would be more convenient and desirable for all the elementary school children. The addition of loose materials for creative-manipulative play.

The priorities listed are some of the easily introduced adaptations that can made the Lord Roberts playgrounds immediately accessible to the disabled child. The site plan drawing can be viewed as a dynamic product towards which the play space can evolve.

The same principles may be easily applied to other existing play spaces to make them accessible to all children—fit or disabled.

7. Summary and Conclusions

Play is an extremely important aspect in the physical, mental and social growth of a child. A child's welfare and prosperity is directly related to the surrounding environment and his capability to interact intelligently and responsively to it. The playground is one environment not to be overlooked in the development of a child.

All children do not have the same ability to prosper from intense interaction with the environment. A handicapped child is limited in his abilities yet, like normal children, is unlimited in desire. There are many different types and reasons why a child may be handicapped. Mildly handicapped children can usually adjust and enjoy all aspects of modern playgrounds. Others, however are severely restricted in their experiences at playgrounds, not because they lack initiative, but rather it is too frustrating or dangerous to try and adapt to the facilities that were designed without them in mind.

The report has presented guidelines for the design of integrated playground facilities for both normal and handicapped children. The guidelines reflect those elements to be considered in the selection of a site for a playground accommodating disabled children; the use of materials and the planning of the playsite along with the design of specific play elements which may comprise the play environment.

While there are many types of play environments and also a great number of disabilities that can afflict children, this report has dealt primarily with the design of an integrated free play environment for both able-bodied and disabled children. The physically handicapped child who is non-ambulatory or semi-ambulatory constituted the primary focus for the design.

Lord Roberts Elementary School presented itself as an ideal location for an exemplary design. It is the only elementary school in Winnipeg offering the normalization program for the physically handicapped child. The existing playground offered the opportunity to illustrate both the design of facilities for integrated play, and the adaptation of existing facilities to accommodate the disabled child. Ideas can be developed for application in community play spaces from this experience.

The free play environment was proposed so that the disabled child could learn how to use the facilities during school hours while, if necessary, assistance could be given from teachers or therapists. During post-school hours or weekends the disabled child could return with peers, brothers, sisters, or parents to experience the play environment. Thus, the operation of the playground and subsequent use by disabled children would not be dictated by the hours of supervision. In the summer months the integrated playground would be a valuable addition to the leisure adaptive play program offered by the City of Winnipeg Parks and Recreation Department.

The design illustrates how playground facilities can be adapted to include the combined play of able-bodied and disabled children with not a reduction but an increase in the richness and variety of the play environment. A play environment accommodating the handicapped child should be stimulating, imaginative and creative for the able child; a play space for handicapped children is a play space for all children.

Appendix

COMMON POISONOUS PLANTS

FILMED FROM
BEST COPY AVAILABLE

HOUSE PLANTS

Plant	Toxic Part	Symptoms
Hyacinth, Narcissus, Daffodil	Bulbs	Nausea, vomiting, diarrhea. May be fatal.
Oleander	Leaves, Branches	Extremely poisonous. Affects the heart, produces severe digestive upset and has caused death.
Poinsettia	Leaves	Fatal. One leaf can kill a child.
Dieffenbachia (Dumb cane) Elephant ear	All parts	Intense burning and irritation of the mouth and tongue. Death can occur if base of the tongue swells enough to block the air passage of the throat.
Rosary pea, Castor bean	Seeds	Fatal. A single rosary pea seed has caused death. One or two castor bean seeds are near the lethal dose for adults.
Mistletoe	Berries	Fatal. Both children and adults have died from eating the berries.

FLOWER GARDEN PLANTS

Larkspur	Young plant, Seeds	Digestive upset, nervous excitement, depression. May be fatal.
Monkshood	Fleshy roots	Digestive upset and nervous excitement.
Autumn crocus, Star-of-Bethlehem	Bulbs	Vomiting and nervous excitement.
Lily-of-the valley	Leaves, Flowers	Irregular heart beat and pulse, usually accompanied by digestive upset and mental confusion.
Iris	Underground stems	Severe, but not usually serious, digestive upset.
Foxglove	Leaves	One of the sources of the drug digitalis, used to stimulate the heart. In large amounts, the active principles cause dangerously irregular heartbeat and pulse, usually digestive upset and mental confusion. May be fatal.
Bleeding heart (Dutchman's breeches)	Foliage, Roots	May be poisonous in large amounts. Has proved fatal to cattle.

VEGETABLE GARDEN PLANTS

Rhubarb	Leaf blade	Fatal. Large amounts of raw or cooked leaves can cause convulsions, coma, followed rapidly by death.
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ORNAMENTAL PLANTS

Daphne	Berries	Fatal. A few berries can kill a child.
Wisteria	Seeds, Pods	Mild to severe digestive upset. Many children are poisoned by this plant.
Golden chain	Bean-like capsules in which the seeds are suspended	Severe poisoning. Excitement, staggering, convulsions and coma. May be fatal.

Plant	Toxic Part	Symptoms
Laurels, Rhododendron, Azaleas	All parts	Fatal. Produces nausea and vomiting, depression, difficult breathing, prostration and coma.
Jessamine	Berries	Fatal. Digestive disturbance and nervous symptoms.
Lantana camara (red sage)	Green berries	Fatal. Affects lungs, kidneys, heart and nervous system. Grows in the southern U.S. and in moderate climates.
Yew	Berries, Foliage	Fatal. Foliage more toxic than berries. Death is usually sudden without warning symptoms.

TREES AND SHRUBS

Wild and cultivated cherries	Twigs, Foliage	Fatal. Contains a compound that releases cyanide when eaten. Gasping, excitement, and prostration are common symptoms that often appear within minutes.
Oaks	Foliage, Acorns	Affects kidneys gradually. Symptoms appear only after several days or weeks. Takes a large amount for poisoning. Children should not be allowed to chew on acorns.
Elderberry	Shoots, Leaves, Bark	Children have been poisoned by using pieces of the pithy stems for blowguns. Nausea and digestive upset.
Black locust	Bark, sprouts, foliage	Children have suffered nausea, weakness and depression after chewing the bark and seeds.

PLANTS IN WOODED AREAS

Jack-in-the-pulpit	All parts, especially roots	Like dumb cane, contains small needle-like crystals of calcium oxalate that cause intense irritation and burning of the mouth and tongue.
Moonseed	Berries	Blue, purple color, resembling wild grapes. Contains a single seed. (True wild grapes contain several small seeds.) May be fatal.
Mayapple	Apple, foliage, roots	Contains at least 16 active toxic principles, primarily in the roots. Children often eat the apple with no ill effects, but several apples may cause diarrhea.

PLANTS IN SWAMP OR MOIST AREAS

Water hemlock	All parts	Fatal. Violent and painful convulsions. A number of people have died from hemlock.
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PLANTS IN FIELDS

Buttercups	All parts	Irritant juices may severely injure the digestive system.
Nightshade	All parts, especially the unripe berry	Fatal. Intense digestive disturbances and nervous symptoms.
Poison hemlock	All parts	Fatal. Resembles a large wild carrot. Used in ancient Greece to kill condemned prisoners.
Jimson weed (thorn apple)	All parts	Abnormal thirst, distorted sight, delirium, incoherence and coma. Common cause of poisoning. Has proved fatal.

Bibliography

- Austin, Richard L. and Gene A. Hayes, 1974. Playgrounds and Play Spaces for the Handicapped. A research publication developed by Theraplan, Incorporated.
- Austin, David R., 1978. "Playgrounds for the Handicapped". Summary of the segment of Dr. Austin's presentation dealing with playgrounds for the handicapped.
- Bengtsson, Arvig, 1974. The Child's Right to Play. International Playground Association.
- Caplan, F. and T. Caplan, 1973. The Power of Play. Anchor Press, Doubleday.
- Carter, A. "A Playground for all Children" in Progressive Architecture 4:78 pp.90-91.
- Central Mortgage & Housing Corporation (C.M.H.C.), 1979. "Design Guidelines: Play Opportunities for School Age Children, 6-14 Years." (Review Copy). Ottawa.
- , 1978. Play Spaces for Preschoolers. Design guidelines for the development of preschool play spaces in residential environments. Ottawa.
- , 1977. Creative Playground Information Kit 1. Ottawa.
- , 1977. Adventure Playground Information Kit 2. Ottawa.
- City of New York, Department of City Planning, 1976. A Playground for all Children. Book 1, User Groups and Site Selection. HUD contract no. H-2388. Superintendent of Documents, U.S. Government Printing Office, Washington, D.C.
- , 1978. A Playground for all Children. Book 3, Resource Book. HUD contract no. H-2388. Superintendent of Documents, U.S. Government Printing Office, Washington D.C.
- Cratty, Bryant J., 1972. Educational Games for Physically Handicapped Children. Love Publishing Co.
- Dattner, Richard, 1969. Design for Play. Van Nostrand Reinhold Co., New York.
- , 1971. "On Making a Playground Swing", American School and University 43:12, August.
- Ellis, M.J., 1973. Why People Play. Prentice Hall.
- , 1971. "Today's Playground: Designed for Chimp or Child", American School and University 43:12, August, pp.21-23, 40.
- Friedberg, M. Paul, 1970. Play and Interplay. The MacMillan Co., Collier-MacMillan Ltd., London.

- , 1975. Do It Yourself Playgrounds. The Architectural Press Ltd., London.
- Frost, Joe L. and Barry L. Klien, 1979. Children's Play and Playgrounds. Allyn & Bacon, Inc., Boston.
- Geddes, Delores, 1974. Physical Activities for Individuals with Handicapping Conditions. C.V. Mosby Co., St. Louis.
- Handicapped Adventure Playground Associations, 1974. Adventure Playgrounds for Handicapped Children. H.A.P.A., London.
- Hewes, Jeremy John, 1974. Build Your Own Playground. Houghton Mifflin Co., Boston.
- Holte, R.N., E. Von Kampen and A.J. Earnshaw, 1977. Technical Aids for Handicapped Children. Rehabilitation Centre for Children, Winnipeg.
- Hunt, Valerie, 1955. Recreation for the Handicapped. Prentice-Hall Inc., New Jersey.
- Kamenetz, Herman, 1969. The Wheelchair Book. Charles C. Thomas, Illinois.
- Kennedy, Joan H., 1974. Orthopedic Splints and Appliances. Bailliere Tindall, London.
- Kraus, Richard, 1973. Therapeutic Recreation Service—Principles and Practice. W.B. Saunders Co., Toronto.
- Lady Allen of Hurtwood, 1968. Planning for Play. M.I.T. Press, Cambridge, Mass.
- Melvin, James H., 1979. "Play Spaces to Accommodate Disabled Children". A practicum study, Department of Landscape Architecture, Faculty of Graduate Studies, University of Manitoba.
- Mogford, Kay, 1977. "The Play of Handicapped Children" (pp. 170-184) in Trizard, Barbara and David Harvey (ed.). Biology of Play. Spastics International Medical Publications, London.
- Moore, Robin, 1972. "Project WEY Washington Environmental Yard!". Brochure by Washington Elementary/University of California School, Berkley, California.
- , 1973. "Open Space Learning Place". New School of Education Journal. Vol. II #4/Vol. III #1, 1973.
- , 1974. "Anarchy Zone: Kid's Needs on School Grounds". Landscape Architecture, October.
- , 1975. "The Environmental Design of Children-Nature Relations; Some Strands of Applicative Theory". U.S. Forest Service/Pinchot Institute, Children, Nature and the Urban Environment, Symposium-Fair, Washington, May 1975. Proceedings.

- , 1974. "Patterns of Activity in Time and Space: The Ecology of a Neighbourhood Playground", in Psychology and the Built Environment, Ed. David Carter and Terrance Lee. London: Architectural Press.
- , 1975. "The Place of Adventure Play in Urban Planning for Children's Leisure", in International Playground Association Conference Report, Milan, September.
- , and Herb Wong, 1975. Curricular Spaces, Draft Manuscript, December.
- Nicholson, Simon, 1971. "How Not to Cheat Children. The Theory of Loose Parts". Landscape Architecture, October 1971, Vol. 62, No. 1, pp. 30-34.
- Piaget, Jean and Barbel Inhelder, 1969. The Psychology of the Child. Basic Books Inc., New York.
- Piaget, Jean, 1962. Play, Dreams, and Imitation in Childhood. Norton, New York.
- Richter, Nora, 1978. "A Playground that Welcomes the Handicapped" (pp. 90-91). A.I.A. Journal, March.
- Vannier, Maryhelen, 1977. Physical Activities for the Handicapped. Prentice-Hall Inc., New Jersey.
- Wilshire, E.R. (Ed.) et al, 1974. Equipment for the Disabled—Disabled Child. Vol. 9, 3rd Edition, December 1974. National Fund for Resarch into Cripple Disease.

**PROJECTS SUPPORTED BY CMHC AS PART OF THE RESEARCH AND DEVELOPMENT PROGRAM
UNDERTAKEN BY THE CHILDREN'S ENVIRONMENTS ADVISORY SERVICE (CEAS) FOR THE
INTERNATIONAL YEAR OF THE CHILD**

The research reports from the following projects are available through the Canadian Housing Information Centre, Canada Mortgage and Housing Corporation, National Office, Montreal Road, Ottawa, K1A 0P7.

1. INTERNATIONAL INVENTORY AND COMPARATIVE STUDY OF LEGISLATION OF PLAY SPACES

This will provide a basis for comparison of CMHC standards and policies with those of other countries, regarding the allocation of space for children in the residential environment and is seen as a resource for municipalities establishing such standards.

Aussi disponible en français.

2. HOUSING CANADA'S CHILDREN - A DATA BASE

The compiled statistics will provide a profile of Canadian children and their housing.

3. MAINTENANCE AND RETROFITTING COSTS OF CHILD-RELATED FACILITIES IN THE REAL ESTATE PORTFOLIO

Life cycle costing of child-related facilities and maintenance costs due to lack of child-related facilities will be used to determine cost effective solutions.

4. EVALUATION OF EXTERIOR FACILITIES FOR CHILDREN IN THREE LOW INCOME PROJECTS

The report will provide an evaluation of three approaches to play space design in terms of play experiences, use by different age groups, accessibility, and resident satisfaction, using a technique that allows children to respond naturally.

5. CHILD'S PERCEPTION OF THE NEIGHBOURHOOD

The study will document how children use selected urban neighbourhoods that vary in character and the influence of the design of the neighbourhood on the children's activities.

6. HOUSING NEEDS OF URBAN NATIVE FAMILIES - A COMPARATIVE STUDY OF CHILDREN'S AND PARENTS PERCEPTIONS

A study of the needs of native children and their parents in the area of housing, neighbourhood and community, on the basis of which housing strategies can be developed to respond to their needs in the urban setting.

7. WORKSHOP: "HOUSING THE FAMILY IN 2001", FOURTH CANADIAN CONFERENCE ON CHILDREN

The report deals with the changing family structure, the needs of children and the suitability of present forms of neighbourhood design to house the future family.

8. LOST AND FOUND: RECYCLING SPACE FOR CHILDREN

The study deals with the identification of waste or unused spaces in residential projects and design suggestions to recycle them into play spaces for children.

9. OUT OF THE CELLAR AND INTO THE PARLOUR - GUIDELINES FOR THE ADAPTATION OF RESIDENTIAL SPACE FOR THE CARE OF PRE-SCHOOL CHILDREN

The study will utilize existing knowledge of indoor and outdoor environmental requirements of children in order to accommodate the developmental needs of pre-schoolers in conventional family living space.

10. PRAIRIE WINTER PLAY PATTERNS

The project goal is to provide for children's play during the winter months, and will be conducted in two parts: (a) A study of social and environmental factors influencing children's activities in winter, and (b) A study of climatic, topographical and environmental factors that must be considered in the design of winter play facilities that accommodate physical, social, creative and intellectual play.

11. DESIGN CRITERIA FOR THE DEVELOPMENT OF A SHELTERED PLAY SPACE IN MEDIUM TO HIGH DENSITY FAMILY HOUSING PROJECTS IN THE ATLANTIC REGION

The report will examine the need for sheltered play facilities in high density family housing projects and recommend design details such as location, size, space allocation, construction materials, and play facilities.

12. PROJET PARAPLUIE - A USER GENERATED SHELTER DESIGN FOR THE RECREATION OF SCHOOL-AGE CHILDREN IN A MONTREAL PROJECT

The report will document a procedure that was used to involve school age children and their parents in the design, implementation, maintenance, and management of a sheltered play space, as a possible model for other residential developments.

Aussi disponible en français

13. GUIDELINES FOR THE SELECTION OF CONSTRUCTION MATERIALS, CONSTRUCTION METHODS, LANDSCAPE MATERIALS AND VEGETATION USED IN PLAY SPACES

An inventory of materials, finishes and methods with a description of qualitative characteristics and possible use in a play space in terms of user groups, climatic conditions, availability and maintenance will be produced.

14. PLAY SPACES TO ACCOMMODATE DISABLED CHILDREN

Design suggestions will be developed for an integrated play space that accommodates both disabled and normal children.

15. CHILDREN'S PLAY SPACES ON ROOF DECKS

The study will result in design suggestions that deal with the technical aspects, such as drainage, containment, and control of the microclimate, as well as the provision of stimulating play opportunities for child users.

16. LA SECURITÉ DES ENFANTS VS LA CIRCULATION - AUTO

The study will analyze accident statistics and traffic patterns in selected multiple housing projects and develop design suggestions in terms of traffic separation, lighting, landscaping, barriers, etc., to minimize the conflict between automobiles and children.

17. A CASE STUDY OF A COMMUNITY PARTICIPATION PROCESS FOR IMPROVING A NEIGHBOURHOOD TO BE MORE SUPPORTIVE OF CHILDREN AND YOUTH.

The case study will identify the process of community participation, the mechanisms available, the problems faced, and the resources tapped, and will serve as a model for other communities.

18. ADAPTATION OF CMHC DESIGN GUIDELINE ADVISORY DOCUMENT "PLAY OPPORTUNITIES FOR SCHOOL AGE CHILDREN, 6-14 YEARS", TO MUNICIPAL LEGISLATION

An example or model policy guideline on planning for play for school age children that is applicable to the municipal residential development control approval process and is written in such a way as to be easily adopted by municipalities.

19. MANAGING URBAN SPACE IN THE INTEREST OF CHILDREN

The proceedings of the International Symposium, dealt with the allocation of urban space to respect children's interests and the political, legal and socio-economic conditions required for various forms of organizations to function adequately. The report has been published by "Man and his Biosphere", the organizers of the symposium. Requests received will be forwarded to "Man and his Biosphere".

20. INCENTIVES AS AN AID FOR IMPROVING THE QUALITY OF THE FAMILY HOUSING ENVIRONMENT: A POSITION PAPER

The position paper will investigate alternatives which can serve as incentives to developers under the National Housing Act, to provide children's facilities within residential developments.

21. MONOGRAPH SERIES

Monograph one: Child Pedestrian Safety in Residential Environments.

Monograph two: Families with Children Living Off the Ground.

Other titles will be announced in the CEAS newsletter.